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ORIGINAL COMMUNICATIONS.

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TUBERCULOSIS OF THE MIDDLE EAR WITH REPORT OF A CASE.*

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Tubercular involvement of the middle ear, although rather an uncommon condition, occurs with much greater frequency in children than in adults. It occurs during the advanced stages of tuberculosis, but is a comparatively rare complication of pulmonary tuberculosis in adults.

Schwabach found among 139 cases of phthisis in one hospital, 8 or 6.9 per cent, who had aural suppuration, while in another hospital out of 139 cases of tuberculosis, 11 or 7.9 per cent had aural suppuration.

Moldenhauser found that out of 294 cases, 35 complained of disturbance of hearing of one or both ears with or without purulent secretion, but in only 7 or 2.4 per cent of the cases could a diagnosis of tubercular disease of the ear be made with absolute certainty.

St. Clair Thomson found only two tubercular otitis media cases out of 700 pulmonary tubercular patients at the King Edward VII Sanatarium. The condition was painless and the discharge slight.

Logan Turner and Fraser found 5 out of 120 cases of pulmonary tuberculosis to have otitis media, and in only 1 of the 5 was there any suspicion of middle ear tuberculosis.

Carr, in 120 post-mortem examinations in children dying of tuberculosis, found middle ear and temporal bone tuberculosis in 3 cases

Price-Jones in 21 cases of tuberculosis in children examined post-mortem found 2 cases.

*From the Chicago Municipal Tuberculosis Sanitarium.
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Hill found, in 269 post-mortems in tubercular children, 15 cases of tubercular ears.

True enough, if all cases of suppurative otitis media had the discharge examined microscopically and cultured, many more cases would probably be discovered, but it must be remembered also that not every ear infection coming under observation in the course of tuberculosis is necessarily a tubercular process. The true diagnosis of tuberculosis of the middle ear is often mistaken because of the insidious onset, and because when the case presents itself the condition has usually passed from a pure tubercular process to one of a mixed infection, the symptoms of the suppurative condition masking the true nature of the initial disease.

Invasion of the middle ear by tuberculosis may be primary or secondary. The larger proportion are secondary to a tuberculous involvement elsewhere in the body, especially pulmonary. From the otologist's standpoint, it can be readily seen that the presence of a tuberculous condition of the pharyngeal adenoid may lead by continuity to an invasion of the tympanic cavity and its connecting structures. The disease may occur as a complication of pulmonary phthisis at any stage, but is most common in the advanced stages.

Primary tuberculosis of the ear is a rather rare occurrence, and its location is generally in the mastoid process. It may be the result of blood or aerial infection. It is difficult to rule out that there is not some small primary focus elsewhere in the body that has escaped the eye of the pathologist.

Certain conditions predispose to involvement of the middle ear by tuberculosis, and among these are tubercular lesion elsewhere in the body; unhealthy environment; age—children being more susceptible than adults; association with tubercular individuals; any condition lowering the resistance of the individual, such as general debilitating diseases, specific infections, etc.; and hereditary influences.

The most common channel of infection is invasion of the bacilli in air traveling up the tuba auditiva to the tympanic cavity. Other channels of infection are infection spreading from the mucosa of the tuba auditiva; infection spreading by way of lymphatics; through the blood stream; from the external ear; and extension from intracranial infection.

Tubercular involvement extending along the tuba auditiva is much more common in children than in adults, due to the fact that the tube is much shorter and wider in children.

Experiments by Young and Milligan show that smoke insufflated into the tube passes directly to the tympanic antrum. Air borne bacilli may in a similar manner be driven beyond the tympanic cavity by strong blasts of air such as is produced by sneezing and violent coughing.

The structures adjacent to the pharyngeal end of the tuba auditiva, especially the adenoids, when the seat of a tubercular infection are the frequent cause of extension to the ear.

The lymphatics over the mastoid are primarily involved together with the superior cervical chain, and infection of this group leads directly to involvement of the tympanic cavity.

Infection which arises through the blood stream from a tubercular focus anywhere in the body is very important and constitutes the large proportion of the so-called primary tubercular mastoiditis.

Tubercular infection arising from the external ear through an existing perforation has been reported, but it must be admitted that it occurs infrequently.

In patients where a tubercular intracranial infection exists, extension may take place to the inner ear by various avenues, but especially along the nerves or vessels of the meatus acousticus internus or the structures of the aquaeductus vestibuli or aquaeductus cochlearis.

Tuberculosis of the middle ear runs either an acute or chronic course. In the acute form there is rapid formation of tubercles which are deposited in large numbers throughout the tympanic cavity. Politzer has described them as pearly gray spots with sharply defined outlines and with very little surrounding inflammation, though in some cases the entire area of the membrane may assume a reddened or pinkish tint. Sometimes these gray tubercles can be seen on the membrana tympani and Milligan has been able to see them through an intact, semi-transparent membrane. These tubercles lead to multiple perforations, rapid destruction of tissue and the formation of granulomata. At the onset, tubercle bacilli are found in the discharge from the ear in fairly large numbers, but later the process becomes contaminated by septic or putrefactive organisms and no specific bacteria can be isolated.

The chronic form of the disease is by far the most common type encountered and the one that is most typical. The disease usually appears with very little in the way of subjective symptoms. The patient may complain of very slight impairment of hearing and the presence of subjective noises, but there is almost a complete absence of pain.

As in the acute form, tubercles are deposited in the tympanic cavity and on the drum membrane. These caseate early, breaking down and forming superficial ulcers which extend to the deeper part of the mucosa and to the underlying bone. Those deposited on the drum membrane produce multiple perforations which coallesce, causing rapid destruction of the membrana tympani. Blake and Buck believe that the appearance of a painless perforation in the posterior superior quadrant of the drum membrane is a characteristic symptom of beginning tuberculosis of the middle ear.

The discharge at first is slight, and is watery, cloudy or may be bloody. This may be the first thing noticed by the patient. Later, however, after there is contamination by mixed organisms, the discharge is thick and profuse, and after bone involvement has taken place, is fetid.

Granulations soon form from the lining membrane of the promontory and contiguous structures, and often encroach on the tympanic cavity. These granulations are pale, friable and edematus. They may disappear later, leaving bare tympanic walls which may be seen or felt.

Necrosis of the underlying bone occurs rather early in the disease, and is prone to be very extensive and widespread, a very characteristic feature being the formation of large sequestra. This is usually accompanied by very little pain, bone tenderness or fever. Owing to this early and extensive destruction of bone, the facial canal is quite often attacked, resulting in a facial paralysis and producing complete or partial terminal loss of function of the seventh nerve. Hence, facial paralysis coming on early in cases of discharging ear, if malignancy can be excluded, should be considered as strong evidence of a tubercular infection being present. Milligan states that in 45 per cent of cases of proven tuberculosis of the ear, facial parlaysis was present, while in non-tuberculous cases, it was not present in more than 2 per cent to 5 per cent.

The Koch bacillus appears to have a strong selective action for the stapedio vestibular articulation and the membrana cochlearis, thus invading the protecting membranes in these areas, and entering into and involving the end organs of the labyrinth, causing progressive destruction. It was found that in 33 per cent of cases of tuberculous disease of the middle ear submitting to a post-mortem examination, perforation of the fenestra vestibuli or fenestra cochleae was present. The labyrinth is also at times involved by erosions through the bony walls.

Enlargement of the lymphatic glands over the mastoid and in front of the tragus is present early in the majority of cases of tubercular middle ear disease. Later, the glands of the neck are involved. This is extremely important as an aid to diagnosis, as it is very uncommon to have glandular involvement in non-tubercular otitis media, and when present, the few glands that are enlarged exhibit symptoms of inflammation, being tender, painful, etc.

In many operated cases, after incision has been made through the periosteum, an opening is found in the cortex of the mastoid filled with cheesey material. This sinus leads into a well defined cavity in the mastoid filled with similar material.

In diagnosing tubercular involvement of the middle ear from the pathogenic form of the disease, much stress should be laid on the history of the case. The family history should be carefully considered with regard to exposure, environment and so forth, but it must be remembered that not all cases of disease of the middle ear occurring in patients exposed to or suffering from tuberculosis are tuberculous in character, nor, on the other hand, is it proof that because the tubercle bacillus is not found in the discharge that the process is not tuberculous in character. The tuberculous form of middle ear disease is always latent, and differs from the pathogenic form by its painless onset, early enlargement of the lymphatic glands, particularly those situated over the mastoid and in front of the tragus, the tendency to multiple perforations, extensive destruction of bone and early facial paralysis. In the pathogenic form, however, there is present an acute process which is usually accompanied by pain, fever, and a tendency to heal, and in which involvement of the lymphatic glands and early facial paralysis is rare.

Of course, the most important factor in diagnosis is demonstrating the tubercle bacillus in the discharge from the middle ear. This is very difficult, as the process rapidly becomes contaminated with pathogenic bacteria, and the tubercle bacillus is rarely demonstrable in the resulting thick, profuse discharge. The microscopic examination of a bit of granulation tissue or of a freshly removed gland may exhibit the bacillus or giant and epitheloid cells.

At the time of operation, the finding of large sequestra should make one suspicious. At this time scrapings should be made from the mastoid cavity for microscopic examination, culturing, and inoculation into animals.

In the acute form of the tuberculous type the course is very rapid, and is fatal as it generally occurs in patients in the last stages of pulmonary phthisis. The chronic form runs a slow, painless course.

The complications following tubercular invasion of the middle ear may be visceral or intracranial. Of the latter, which is the one we are particularly interested in, many conditions may arise, but we especially wish to mention tubercular pachymeningitis externa, tubercular thrombosis of the lateral sinus, hemorrhage from the carotid artery, tubercular labyrinthitis and tubercular meningitis. Tympanic tuberculosis rarely leads to tubercular meningitis, though such does occur, as is shown in our case.

The prognosis in tubercular middle ear disease is grave. Where there is much destruction of bone, with foul smelling discharge and facial paralysis, the risk is great and the outlook very unfavorable. Age also is a factor and the prognosis is much worse in infants and children. Advanced tuberculosis elsewhere in the body increases the gravity of the prognosis. Primary mastoiditis, if promptly operated upon and the focus eradicated before the condition becomes subacute or chronic, on the other hand, offers a more favorable prognosis. The majority of cases occur in young children, and Milligan said, "At least 40 per cent of my cases of proved tubercular infection have succumbed to the disease, some from tubercular or septic meningitis, others from pulmonary phthisis, intestinal tuberculosis, acute miliary tuberculosis and general morasmus."

General treatment must be rigidly carried out in these cases as it is as important as the local treatment. The patient should be in clean, healthy surroundings with freedom from care and strain. He should live in the open air as much as possible and should be given an abundance of good, nourishing food.

If the pulmonary condition is not advanced and the patient can be put into good condition, operation is indicated, with wide removal of diseased tissue and promotion of efficient drainage. This helps out the general condition in many cases, besides curing the local process at times. On the other hand, in cases with an advanced pulmonary phthisis, operative interference is contra-indicated. However, if retro-auricular abscess is present and there is evidence of sequestra which is interfering with drainage, operation should be performed in order to benefit the patient as much ass possible.

Of course, primary involvement of the middle ear by the tubercle bacillus calls for immediate operation and eradication of the focus of infection.

REPORT OF CASE.

History: J. M., a colored boy, aged 14, a patient of the Chicago Municipal Tuberculosis Sanitarium since Jan. 23, 1924.

Past Diseases: Had influenza about three years ago. He had spent the first six months of 1923 at the tubercular sanatarium at Wauwautosa, Wisc.

His chief and only complaint at the time of entrance to the institution was headaches. There was no cough nor expectoration, no pain nor dyspnea. Bowels were active and appetite good. His physical examination at that time disclosed a fairly well developed and nourished child with palpable glands. The thyroid was enlarged.

Ears were normal.

X-ray Examination: Jan. 24, 1924: Some infiltration of the base of the right lung, but does not reach periphery.

Mar. 2, 1923: Infiltration running upward from the hilus into the apex on both sides.

Jan. 26, 1923: Hilus is eccentuated and has a fan running upward to the apex and outward to the periphery on both sides of the chest. Thickened bronchus on the right with a few calcified glands.

Laboratory Reports: Sputum was positive for TB from Oct. 10, 1923, to Sept. 10, 1924. Wassermann tests were negative.

On Jan. 13, 1925, the patient came to the infirmary because of bilateral deafness and slight pain in the ears. His temperature the previous five days had ranged from 96.2° to 100° and pulse from 120 to 150. Examination of the ears disclosed a small mucous discharge in the right external canal with slight congestion of the tympanic membrane and a small perforation in its upper posterior quadrant. The left tympanic membrane was diffusely congested and bulging, and incision of the membrane made in the posterior inferior quadrant. Dry treatment of each ear was instituted. Both ears discharged only a moderate amount and the temperature from Jan. 16 to Feb. 20, 1925, varied from 97° to 100.4° with a pulse rate of about 100. One month after incision of the left tympanic membrane, slight pain and swelling developed in the glands of that side over the mastoid process and in front of the auricle.

On Feb. 26, 1925, the patient had a marked edema and fluctuation over the left mastoid area. The discharge from the left ear was quite scant and the fundus of the canal was contracted. Temperature was 99° and pulse 100. The leukocyte count was 14,750. Mastoid operation was advised.

The following day, under ethylene anesthesia administered by Dr. Winner, the left mastoid was opened. A marked softening of the cortex and the region of the pneumatic spaces was noted. A considerable mass of granulations was found in the tympanic antrum. Very little chiseling was necessary, the entire mastoid area being

evacuated by means of the curette. The wound was closed by Michael clips and drainage established with a small strip of iodoform gauze.

The patient made a fairly rapid recovery from the operation and at the end of the second week the post-auricular incision had closed. The left ear ceased to discharge on the fourth day after the operation.

The laboratory report of bone scrapings and granulations removed at the time of the operation was negative for tubercular bacilli, negative for streptococci, but positive for staphylococci. It must be remembered that it is extremely difficult to demonstrate the tubercle bacillus by direct smear.

On Mar. 20, 1925, the patient suddenly developed increased, severe agonizing headaches, rise of temperature and some rigidity of the muscles of the neck, giving every indication of the onset of a diffuse meningitis. A direct smear of the spinal fluid at this time was negative for tubercle bacilli. The meningeal symptoms diminished in severity on the third day after onset only to recur on the sixth day with increased intensity. The patient had a positive Kernig and Babinski, marked rigidity of the muscles of the neck, temperature ranging from 101° to 104° with pulse rate of 150. This increase of severity of the symptoms was followed by frequent convulsions with spasmodic contractions of the muscles of the back and neck. General paralysis developed followed by coma, from which the patient could not be aroused, death finally resulting on the tenth day after the onset of acute meningeal symptoms.

The autopsy performed by Dr. H. Sweaney, pathologist of the Chicago Municipal Tuberculosis Sanitarium, showed the following: The right ear had a waxy discharge. Posterior to the left ear, over the mastoid process, was a fairly well healed vertical scar 5 c.m. long, with no discharge coming from the left ear.

At the hilum of the right lung were numerous enlarged lymph glands which presented a pinkish to black surface on section. The left lung also showed enlarged lymph glands about the hilum. There was a small cavity in this lung, 4 c.m. from the apex of the lower lobe, filled with pus and several small lung stones.

The brain weighed 1450 gms. On removing the calvarium no gross abnormalities were visible. On separating the dura, the pacchеonion bodies were found to be inflamed. The dura as a whole was slightly thickened and the meningeal vessels were found to be highly congested. On removing the brain, fine fibrous adhesions

between the extreme temporal pole of the temporal lobe and the underlying dura were found. The pia at this point was covered with a small amount of caseous material. The dura about the infundibulum was greatly thickened, forming a very firm bridge between the clinoid processes of the sphenoid bone. On separating the dura from the floor of the cranial cavity there was a marked erosion resulting in a worm-eaten appearance of the bone over the posterior area of the petrous portion of the left temporal bone. This continued over an area ½ c.m. deep just superior to the transverse sinus for two-thirds of the distance from the sigmoid sinus to the occipital protuberance and the eroded area was covered with a film of caseous material. On chiseling away the substance of the petrous portion of the temporal bone, the bone was found to be consumed in parts and its substance replaced by purulent and caseous material. The mastoid cells were in part destroyed and filled with similar material. The semi-circular canal fluid was coagulated and both the acoustic and vestibular portions of the eighth nerve were imbedded in pus. On the right the only gross abnormality was pus in the cavity of the middle ear.

ANATOMICAL DIAGNOSIS.

1. Caseous and calcified chronic tuberculous lymph adenitis.

2. Chronic ulcerative pulmonary tuberculosis.

3. Bilateral chronic otitis media.

4. Tuberculous osteomyelitis of temporal and occipital bones on the left involving the whole eighth nerve.

5. Tuberculous meningitis.

Bacteriology: The fluid pouring from ventricles into the cranial cavity gave streptococcus on culture. Caseous lymph glands and pus from bronchi gave streptococcus, staphylococcus and diplococcus on smear and culture. Guinea pigs injected with meningeal fluid and discharge from the left tympanic cavity and left mastoid cavity showed tubercular lesions.

This case demonstrates several important factors of a tubercular invasion of the middle ear:

1. Extreme difficulty of making a positive diagnosis by direct smear and culture due to early contamination by pathogenic bacteria.

2. Necessity of animal injections as an aid to a positive diagnosis.

3. The insidious onset with little or no pain and scanty discharge from the tympanic cavity.

4. The widespread destruction of bone without symptoms indicating the extent of this process.

5. The occurrence of the tubercular meningitis as a complication, which in this case was the cause of death.

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122 S. Michigan avenue.

CEREBELLAR ABSCESS WITH AN UNUSUAL COMPLICATION.*

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Case report: The feature in this case is that the cerebellar abscess, found at autopsy, might have been found had it not been for the symptom of sensory aphasia. The woman, age 35 years, had had purulent otitis, right, fifteen years. June 23, 1924, fan-like pain, constant, right temporal region. Nausea and vomiting. Dr. Charles Brown, San Diego, found polyp and cholesteatoma; did radical mastoid operation; mastoid bone eburnated; cholesteatoma filled antrum and middle ear. Slight horizontal nystagmus to left for two days. Vomiting ceased; recurred, violently, in one week. Aug. 30, Dr. Brown and Dr. Burger explored temporosphenoidal lobe; negative. Ear healed. Vomiting recurred at intervals. No papilloedema until Nov. 15. At same time, sensory aphasia. Word blindness. This led Dr. Little to suggest neoplasm left temporosphenoidal; osteoplastic flap Nov. 17, by Dr. Burger, revealed nothing in this region. One week later I had the privilege of seeing the patient, in San Diego. Nose and throat negative. Right ear, mastoid cavity clean and dry. Both cochleas showed normal function, tested by audio-amplifier; amplified voice well heard, amplified whisper distinct, tones heard well throughout entire range. Caloric, right, head back (horizontal canal), in 4 seconds, horizontal nystagmus to left. Continued douching; in 21 seconds, there began to be a rotary element to the nystagmus, in both eyes. Douching continued for 4 minutes. No vertigo. No past-pointing, falling, pallor, sweat or nausea.

Wait of 15 minutes. Right ear douched again, head 30° forward (vertical canals). In 23 seconds, mixed horizontal and rotary nystagmus to left. It was soon noticed, on continued douching, that excursions of right eye became greater, until became twice as great as excursions of left eye. Douching continued 4 minutes. No vertigo; no past-pointing, falling pallor, sweat or nausea. She acted, in every way, as if she had not had any vestibular stimulation at all. The one single response was the nystagmus.

Left ear: Head back (horizontal canal). After douching 23 seconds, horizontal nystagmus to right, fair amplitude. After 15 seconds more of the douching, during which the amplitude of the

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nystagmus continued to increase, the right eye rolled slowly and deliberately to the left. At this time and on continued douching, the right eye was near inner canthus and in this position showed nystagmus to right, whereas left eye occupied approximately middle position and showed nystagmus to right. After douching 4 minutes, patient was lifted until head was 30° forward (vertical canals); rotary nystagmus to right, fair amplitude but with some irregularity in rhythm. This nystagmus ceased much sooner than normal. As in right ear, no vertigo, past-pointing, falling or any constitutional response whatever.

From the above it seemed probable that a lesion of left temporosphenoidal cortex would not produce such phenomena. Patient brought to Los Angeles. Above tests repeated. Right ear, head back, douching 3 seconds, horizontal nystagmus to left. Quick component not active. Left eye, deviated to internal canthus; right eye deviated somewhat to right. The quick component, left eye, never went beyond midline. On bringing head forward (vertical canals), mixed rotary and horizontal nystagmus to left, fair amplitude. Dr. Lyster called our attention to a sharp difference, with head in this position: there was no tendency for either eye to deviate to right.

Douche left, horizontal canal. In 8 seconds, vigorous horizontal nystagmus. The quick component never carried right eye even up to midline. On bringing head forward (vertical canals), utter cessation. Both eyes stared straight ahead without slightest movement. Concluded, no function from left vertical canals' stimulation. Head back again (left horizontal canal), prompt vigorous nystagmus. On bringing head forward again, left vertical canals produced no response. Head back again, left horizontal canal, produced good nystagmus, which lasted 4½ minutes. The nystagmus produced by left horizontal canal lasted about twice as long as ordinary normal duration; whereas left vertical canals produced no nystagmus.

Throughout, no vertigo, pallor, sweat or nausea. Patient entirely unaffected by tests.

Resume of vestibular findings: Prompt response of nystagmus, with total absence of vertigo or constitutional responses; the tendency to conjugate deviation, on stimulation of both horizontal canals; the presence of response from left vertical canals on first examination, followed at later date by absence of response; the in-co-ordination of ocular movement, which came into evidence from ear stimulation—the deviation of the left eye inward on douching right ear and the deviation of the right eye inward on douching left ear.

The sensory aphasia continued, however. When shown a cigar, she answered "of course I do not use them", but she could not name "cigar".

The following suggestions were made from the ear standpoint: The following lesions would, as it were, satisfy the findings as expressed above.

1. Abscess or tumor of cerebellum, pressing against brain-stem.
2. Upper portion of brain-stem. Here, however, one would be apt to note spontaneous nystagmus which is not present in this case.
3. If supratentorial, would appear to be deeply located and directly pressing upon upper portion of brain-stem.

It was obviously unreasonable to attempt to explain the sensory aphasia on any other basis than temporosphenoidal.

Patient suddenly died two days later, Dec. 21.

Autopsy: In the region of the left cerebral cortex, covered by the bone flap, were two small areas of necrosis extending into the subcortical white tissue. These areas apparently corresponded to the points into which the exploratory needle had entered at the operation. There had evidently been no post-operative hemorrhage. Enlargement of both lateral ventricles. Large abscess of the right cerebellar hemisphere with a pouting area of pus directly adjacent to the exenterated mastoid cavity, making it evident that there had been a direct extension through the dura at this point from the mastoid into the cerebellum. Right lateral sinus explored and found to be normal. The abscess occupied practically the entire right cerebellar hemisphere.

COMMENT.

1. Otitis media—mastoiditis—operation.
2. Extension of infection to cerebellum, ending in abscess, right cerebellar.
3. Aphasia developing rapidly about Nov. 15, perhaps due to arterial thrombosis.
4. Necropsy findings: *a*, right cerebellar abscess; *b*, small necrotic areas left temporal lobe, explained by softened brain tissues caused by thrombosis (?) and needle punctures.

1920 Wilshire boulevard.

THE CLINICAL VALUE AND DIAGNOSTIC SIGNIFICANCE OF THE NEWER TESTS FOR HEARING.*

Dr. Edmund Prince Fowler, New York City.

The clinical value and diagnostic significance of these tests are so closely related that the one includes, in great part, at least, the other. The older methods for testing the ears, *i. e.*, tuning forks, clicks ticks, whistles, etc., are still valuable and always will be if intelligently used, but are very inaccurate quantitatively. From the patient's standpoint, particularly, testing for speech is invaluable but often misleading. As a diagnostic aid, a single observation made by tuning forks is of little value unless the patient be trained and all the conditions for the test perfect. This is seldom, if ever, obtainable. Untrained ears require from five to ten tests to obtain anywhere near a true average reading. We have found that patients train very rapidly in their accuracy, but, even so, several observations are necessary. Of course, from a purely diagnostic standpoint great accuracy may not be necessary. It seems to be the general opinion that in order to draw an audiogram of the hearing some expensive audiometer is necessary. This is not so; if tuning forks are carefully calibrated and used, very efficient tracings, which differ only in unimportant details from audiometer tracings may be obtained without the aid of any electrical apparatus I have made many such measurements, but find it very laborious on account of the number of observations required and the necessity of waiting the best part of a minute for the fork to die down to minimum audibility at each trial. When the sound has passed this point, the fork has to be again set in maximum vibration, and again allowed to die down before the test can be re-applied; whereas, using my audiometer I can obtain in a few moments an accurate reading at minimum audibility for each frequency. Because this desired point may be approached from above or below, or repeated several times in almost as many seconds, much time is saved to the examiner and much temper, time, and tire to the patient.

The great diagnostic value of accurate audiographs is that they show diagrammatically a complete picture of the hearing capacity

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over the whole range of frequencies for both ears. From written data, it requires a considerable effort to properly place and correlate each detail for even one ear; for both ears, still more effott; for differences between the two ears and between subsequent tests, so much attention that it is seldom adequately done. (Slide showing the value of graphs.)

The highest and lowest tones are not only determined "as heard" but at the exact intensity at which they are heard, *i. e.*, a definite quantitive finding instead of the old qualitative one.

With the lowest forks and higher whistles it is possible to test only roughly the intensity heard, because no one has ever calibrated accurately these instruments for intensity; even the frequency calibrations of several Galton whistles proved on careful tests to be so far from those thought to exist that they were practically useless as precise measures.

From force of habit and training it is difficult to abandon the standard teaching that obstructive lesions show loss for the low frequencies and nerve lesions for the high; and whereas in general this is undoubtedly true, nevertheless we know there are frequent exceptions. A study of many graphs makes me more and more cautious in applying the old dictum.

From a physical standpoint there is every reason to believe that there can be a loss at any frequency in obstructive lesions, depending upon how these happen to affect the acoustic characteristics of the ear.

From a pathological standpoint, end-organ involvement surely can affect the low frequency areas instead of only the high tone regions of the basilar membranes.

However, as a working basis, we still interpret our hearing losses at the low and high frequencies, as has been customary; and thus we still tend to read our audiographs.

By a study of several hundred audiographs many interesting peculiarities of the abnormal human ear are apparent, and it may be that some day we shall, by persisting in our studies, learn a little more as to how the human ear senses sound.

(Here Dr. Fowler showed audiographs of all kinds of deafness, several of them showing the progress of the case over three or four years, and the sequence and degrees with which the different frequencies became affected.)

Briefly, summing up our data, we find that even in normal ears none show a straight normal line; all vary up and down; all vary with time, place, barometer, tire, noises, etc.

1. Many ears believed perfect by the patient show marked defects, especially in the frequencies not used for speech.

2. Many abnormal ears appear to be inherited and change not for years or life. Other members of the same family may have like abnormalities. Is this normal for this ear or this family?

3. The developed defects at certain frequencies, although unnoticed by the patient, may warn the examiner of impending deafness. Sufficient time has not yet elapsed for us to interpret these graphs diagnostically.

4. Returns to normal or near normal are shown with great precision.

5. Failure to return to normal is most importantly demonstrable, and treatment may be undertaken which otherwise would not have been deemed reasonable.

6. Malingering is easily detected, because no one can repeatedly sense correctly a given intensity of sound. (Wild variations point to faking.)

7. To diagnose total deafness in one ear, we may construct for a guide binaural graphs of known instances of monaural total deafness, and compare with such guiding graphs the curves obtained from suspected totally deaf ears. If they agree as to the differences in the losses as between the two ears in such patients, we may put it down as total deafness in the affected ear. (Of course such a guiding graph is obtained by charting the hearing of the good ear from the sound applied to the opposite side of the head.)

Many striking peculiarities and deductions are suggested from the graphs. Attention has been called to most of these in previous articles.

114 East Fifty-fourth Street.

LIGATION OF THE EXTERNAL CAROTID ARTERY FOR THE CONTROL OF IDIOPATHIC NASAL HEMORRHAGE.

DR. F. T. HYDE, Port Angeles, Wash.

Ligation of the common carotid artery for the control of dangerous hemorrhage, or other serious conditions, throughout its field of distribution is not particularly rare, but in a review of the literature for the past five years, I can find no other case of necessity for ligation of the external carotid, as an emergency measure to control an idiopathic nasal hemorrhage. I use the word idiopathic advisedly in reporting this case, because neither cause nor pathology could be found for the condition.

Correspondence with the Annals of Otology, Rhinology and Laryngology, THE LARYNGOSCOPE, *The Journal of the American Medical Association*, and with numerous workers in our special field, reveals no such cases.

The study of the literature on Ligation of the Common Carotid by Willard Bartlett and O. F. McKittrick, of St. Louis, reported in the Annals of Surgery, June, 1917, revealed the fact that the common carotid had been frequently tied with success, but their review cites no case of ligation of the external carotid only.

Several of the journals report tieing of this vessel to control postoperative hemorrhage, following intranasal or oral surgery, but none for simple, uncomplicated epistaxis. Nor do any of the standard works in my library mention this as a method of treatment for nose bleed. Though a *dernier ressort*, it has sometimes to be adopted, and should consequently be mentioned in textbooks of diseases of the nose and throat.

To review the anatomy of the nose before this Society would indeed be "bringing coal to New Castle," but to refreshen our minds with its blood supply may serve to point a moral as well as adorn a tale.

The blood supply comes to the superior portion of the nose from the anterior and posterior ethmoidal branches of the ophthalmic artery. To the posterior and lateral walls of the nasal fossae and to the septum from the internal maxillary, one of the terminal divisions of the external carotid. Inferiorly and anteriorly the blood supply is from the facial, also a branch of the external carotid, and from the ascending pharyngeal and palatine arteries, terminal branches from the external carotid.

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That many of you have successfully used this method for controlling this condition, I do not doubt; that many of you have reported doing it, I question, because of the difficulty of finding case reports; that you should do so I feel should be impressed upon you, that the authors of textbooks may feel constrained to mention it, and that the profession at large may realize that when necessary it is a safe, rational procedure that may in an emergency save life.

The following is a report of such a case:

The patient, Mr. A. R., is a Russian by descent, age 51 years, and for twenty years a resident of this country. He is a rancher by occupation. He lived, and fortunately still lives about twenty-five miles from Port Angeles, Wash., where I practice.

Past history: His first serious nose bleed occurred sixteen years ago, since which time he has had frequent severe nasal hemorrhages, hard to control. The attacks seem to start in the back of his head with a sense of pressure, and come forward to his nose, when bleeding begins. He denies venereal disease and states there is no history of bleeding in his family.

Present illness: One week before I saw him he had a rather severe nasal hemorrhage just after leaving Port Angeles for his home. He turned back and went to a general practitioner, who he said plugged the left side of his nose, and told him he could go home. After driving a few miles in his Ford, I think this not significant, his nose began to bleed violently and he returned to the same physician, who put more packing in his nose, causing blood to come from his left eye, and sent him home. His nose bled a little all the way home, and that evening a physician in his neighborhood was called, who took him to a small private hospital at Sequim.

I now quote the hospital records:

Oct. 11, 7:30 p. m., entered hospital. Pituitrin 1 c.c. given by hypo, with digitol MVIII and adrenalin 1:1000 spray to nose every 3 hours. Soft diet. He had a fairly restful night. Temp. 97°, pulse 96, resp. 24.

Oct. 12: Was given digitol MVIII every 4 hours. Had a comfortable day and night.

Oct. 13: At 2 p. m., severe bleeding came on again and he was given pituitrin 1 c.c. by hypo; digitol MVIII, and 1:1000 adrenalin spray to nose. He rested till 1 a. m. without bleeding, and then had another severe hemorrhage; the same treatment being used, the bleeding stopped. At 3 a. m. he was bleeding freely again, and again the same procedure was followed, with relief from bleeding until the next day.

Oct. 14: At 6 a. m. he was given digitol MVIII and at 9 a. m. ergotole MVIII. There was slight oozing during the day. At

1 a. m. his nose was sprayed with 1:1000 adrenalin. At 2 a. m. he was again bleeding freely. Pituitrin, ergotole and adrenalin were used as on previous occasions. The bleeding stopped and he rested till 7 a. m.

Oct. 15: The ergotole was continued every 4 hours and he bled no more that day.

Oct. 16: No bleeding until 6 p. m., when he had a very severe hemorrhage. Pituitrin and ergotole again used and bleeding stopped until

Oct 17: At 7 a. m., when very free hemorrhage again occurred and continued until 11 a. m., when I was called.

I saw him first at the Sequim Hospital at about noon, Oct. 17. He was a broad, stocky man, very pale, extremely nervous and with an anxious, worried expression. His pulse was 160, small and weak. His physician stated that his blood pressure was on entrance S. 200, D. 110. There was blood all over his face, the bed, and in a basin beside the bed. He was bleeding from both nostrils. After clearing the nostrils and packing tightly with adrenalin gauze for a few minutes the packing was removed and the nose was pale and dry. The right nostril showed a large spur at the junction of the triangular cartilage and vomer, about opposite the superior border of the inferior turbinate and almost touching it. The turbinate was normal in size. No other pathology in right nostril. The left nostril exhibited a large scab-covered area high up on the cartilaginous septum, and nothing else unusual.

Owing to his nervousness the postnasal space could not be seen, the pharynx was dry, though when bleeding he spat blood freely. I carefully packed both nostrils with iodoform vaselin gauze, gave 10 c.c. horse serum, ordered hemoplastin 2 c.c. every 3 hours by hypo and calcium lactate, gr. 25, every 4 hours by mouth. Discontinued the pituitrin, digitol and ergotole and waited an hour. No bleeding appearing, I went home. I had hardly reached my office when they telephoned he was again bleeding and they could not stop it. I returned to the hospital and when I got there the bleeding had stopped. The packing had been removed by the nurse, and the nose was dry. Not seeing any possible cause for the bleeding except the ulcer, I carefully cauterized that with chromic acid, packed the nose again with vaselin gauze, ordered an ⅛ grain of morphia by hypo for the man's nervousness and after waiting two hours, drove home. The patient had no more bleeding during the night. By mistake, the night nurse continued the pituitrin and ergotole.

Oct. 18: I saw him at 8 a. m., found him comfortable, no signs of bleeding, left him severely alone and went home. At 2 p. m., I was called and told that if I wanted to see my patient alive again I

had better hurry. I did, 20 miles in 30 minutes, and found the patient bleeding profusely from both nostrils and making a noise in his throat as if he were gargling. Frequently he would spit out clots of blood that would fill half a teacup. He was extremely restless, afraid he was dying and complained of a splitting pain in the top of his head.

The left posterior naris was plugged and the bleeding in the throat stopped; the left side of the nose was then plugged tightly, at which time blood filled the lacus lacrimalis of the left eye. In a few minutes he complained of blood running down his throat again, when another postnasal plug was put in the right side and the right nostril packed, stopping the bleeding. I explained the seriousness of his condition to his family and having no means of transfusion, advised ligation of the left external carotid. His wife insisted upon a consultant from Seattle, and Dr. A. T. Wanamaker was called. He could not come and sent Dr. W. R. Waltz, who fortunately was able to catch a boat at once, it was 11 p. m., and arrived at the hospital at 7 a. m.

At midnight I gave the patient a ¼ grain of morphia by hypo. I stayed in the hospital through the night, seeing the patient every half hour. He slept till 5 a. m. without bleeding. At 7 a. m., Dr. Waltz arrived, saw the patient, reviewed the case and agreed to the ligation, which was done at once.

Operation: A 2 inch incision was made on the anterior edge of the sternocleidomastoid muscle, its center being half-way between the clavicle and the angle of the jaw. The carotid sheath was quickly found and opened, and the first vessel picked up and thought to be the external carotid, was almost immediately recognized as the superior thyroid with a high origin and an anomalous course. The external carotid was found about one-half inch higher and a double ligature of No. 2 chromic catgut was thrown around it. The precedure occupied twenty-five minutes. All bleeding stopped at once and has never recurred up to the present. A careful examination of the nose and postnasal space at this time disclosed no pathology and no cause for the hemorrhage has been found.

The operative wound developed an infection. The stitches were removed on the third day and the wound irrigated daily with Dakin's solution. On the tenth day it was well and the patient discharged. Two weeks later I saw the patient in my office. He looked to be perfectly well, said he felt so and was building a house. It is now nine months since the operation and the patient continues well and has had no inconvenience from the ligation.

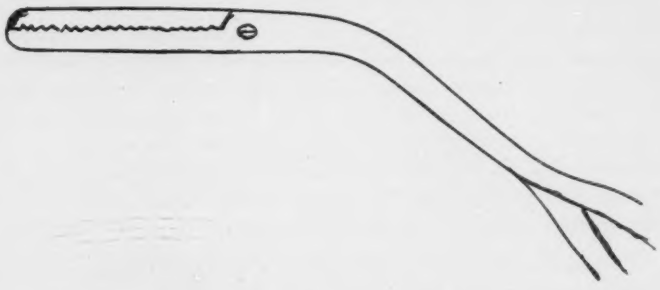
116 Laurel Street.

PARTIAL TURBINECTOMY WITH CLAMP AND CAUTERY.

Dr. M. L. Harris, Brooklyn.

There are quite a number of methods for reducing the size of an hypertrophied, obstructing inferior turbinate, and each operator has his own preference. However any method that is rapid and not followed by troublesome bleeding, to my mind, should be the method of choice. Partial turbinectomy with the clamp and cautery fulfills these requirements.

The inferior turbinate is cocainized with 10 per cent cocain. No adrenalin is used. The redundant tissue is grasped with a special



clamp modified for intranasal application, and the cautery is applied from before backwards and against the clamp until the excess tissue is burned off. Vaselined gauze strips are then placed in the nose on the eschar, removed in 48 hours and repacked until the slough falls off. A linear scar is thus left, the remaining turbinate is uninjured, and the function is not destroyed.

The clamp is 1½ inches long, 1-16th of an inch thick and 5-16th of an inch wide and serrated. It is bent to an angle so that it does not obstruct vision. An ordinary electric cautery with a flat tip is a satisfactory cautery.

1681 Union Street.

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*From the service of Dr. S. J. Kopetzky.

CHRONIC TONSILLITIS AT VARIOUS AGES

Dr. J. I. Berlin, Jersey City, N. J.

The term "chronic" is defined in Steadman's Medical Dictionary as follows: "of long standing, noting a disease of slow progress and long continuance."

While the term "chronic" as above described, may be true in many diseases, the writer believes that such a definition is misleading when we refer to the disease known as "Chronic Tonsillitis," for the reason that one is led to believe that in order to have a chronic tonsillitis, the disease must of necessity have been of long standing or of slow progress and long continuance.

Microscopic examination of a chronic inflamed tonsil reveals an increase in the lymphoid tissue, and an accumulation of connective tissue in the tonsil or stroma, which becomes fibrous in character. In many cases, an increase in the thickness of the tonsillar capsule may be seen. As a result of the above changes, the tonsil becomes large in size and either projects outward towards the median line, or upwards towards the supratonsillar fossa, or may be so buried between the faucial pillars, as to cause a bulge in the median line of the anterior pillar, as a result of the hyperplasia above mentioned.

Needless to say, such a tonsil loses its normal function and not only becomes useless but actually becomes a hindrance to the general health of the patient.

Now, how long does it take for the above pathological changes to take place?

The writer has found that it is possible for a diseased tonsil to become chronic in about a week or ten days, in instances, with a history of but one acute attack. Thus, one may have an acute attack of tonsillitis (at any age, even as young as one year), as will be shown in the table following, followed immediately by an extravasation of blood in the tonsillar stroma and a resulting increase in connective tissue leading to a fibrosis, all of which may occur within a period of one week or so.

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At the New York Post-Graduate Hospital, it is a rule that every tonsil removed be sent to the laboratory for microscopic examination. This rule is rigidly adhered to, thus enabling the writer to compile and tabulate from a series of 733 cases as follows:

Total number of cases.....733

Simple hypertrophy..607 Chronic hypertrophy..126

Divided as follows:

Age	Simple	Chronic	Per cent Chronic
1 to 3	88	4	.043
4 to 7	262	25	.087
8 to 10	101	12	.106
11 to 15	123	34	.216
16 to 19	30	10	.25
20 to 25	2	23	.92
26 to 30	1	9	.90
31 to 39	0	6	1.00
40 to 50	0	3	1.00

Note the number of chronic tonsils at an age as early as one year, with the steady increase in percentage of chronic tonsils agreeing with the increase in age.

In the above group six cases of cartilage in the capsule or at the base, was also noted.

In reviewing the pathological reports of these 733 patients whose tonsils have been removed, the writer found that the number of cases in which the pathologist reported chronic tonsils among children was surprising. A further tabulation of the above group as to sex, showed that beginning at four years and upwards, the female was the greater sufferer of chronic tonsils, while between the ages of one to three yeas the male sufferers were greater in number.

9 Gifford Avenue.

SOME FURTHER OBSERVATIONS ON SUCTION TONSILLECTOMY.

Dr. J. B. H. Waring, Blanchester, Ohio.

As several years have elapsed since suction tonsillectomy was presented to the profession, it may be in order to retrospect, as it were, and to bring out several points in passing, that have been noted in more extensive experience with the operation.

Pioneers in every branch of human endeavor have a perhaps natural way of looking on their particular method of doing a certain thing, as not only the best way, but often, as the only way. No such illusions need be entertained as to suction tonsillectomy; it not only is not the only method for surgical removal of pathological tonsils; but it is not the best. There is no one best method for all types of tonsils; and for all types of operators. For some operators, snare and dissection is the best; for others some form of Sluder operation is best; and for still others suction tonsillectomy will be found best. The personal equation enters largely into any and all surgical operations.

The operator who is satisfied with his snare and dissection results should stick to that operation; and the Sluder-type operator who finds this operation all that he desires should continue to perform this operation. For the operator, however, who is not entirely satisfied with either snare and dissection, or Sluder methods, it is believed that suction tonsillectomy presents certain obvious advantages, from the standpoint of the operator; and from the standpoint of the patient.

Suction tonsillectomy is based on sound mechanical and surgical principles; even as much so as the much discussed intracapsular cataract operation; both are very simple operations in principle; and both remarkably simple in execution, when the proper technic has been acquired; but the technic is one that requires proper equipment to begin with; and then proper use of that equipment. Some operators have attempted the operation without proper equipment, and with more or less complete disregard for the technic; and then blamed the operation for lack of success.

It is useless for an operator to use suction tonsillectomy on three or four cases; perhaps all difficult cases in a row; and expect to

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get the results that will come with a more extended experience with the method. Sluder has stated that he performed at least a thousand tonsillectomies by his highly ingenious technic before he was perfected in the operation. How, then, can any operator expect to develop a finished suction tonsillectomy technic on three or four cases; or to evaluate the operation on such a basis? One operator wrote me that he employed his customary snare and dissection on one tonsil; and suction tonsillectomy on the other. The patient complained of more pain on the suction tonsillectomy side, and he thought there was more bleeding on that side; therefore, it was thumbs down for suction tonsillectomy. Another operator wrote me that he witnessed an alleged demonstration of suction tonsillectomy technic by an aspiring young doctor in New York. His opinion was that if this was suction tonsillectomy, there must be a missing link somewhere. Several more or less prominent New York operators took part in an informal discussion of their brief experiences with suction tonsillectomy, and the dissatisfactions they encountered; clearly in each instance from an absolute disregard to proper technic. A Philadelphia operator wrote me that he had employed the operation in a few cases with brilliant results; and in others with results not so satisfactory. From this, he frankly reasoned that there must be some defect in his technic; which was correct. It is not too much to say that in the vast majority of cases, on all types of tonsils, proper suction tonsillectomy technic will yield perfect operative results. The point we would make here, however, is that the operator should not waste his time with suction tonsillectomy unless he is willing to study the technic carefully; and then to employ the operation a sufficient number of times to observe its workings on the various types of tonsils, and to perfect his operation; "get the hang of it", in other words. There is no trick, or simple twist of the wrist about suction tonsillectomy; but each case requires careful study, and careful performance of the operation step by step, if success is to be attained. Where results are not satisfactory, the operator should seek to discover the why and the wherefore. Some operators will do good work from almost their first case or two; others will require ten or fifteen or twenty or more cases before they have acquired smooth action. I do not advise any operator to attempt to demonstrate the operation to others until he is satisfied that he has perfectly demonstrated the operation to himself.

Suction tonsillectomy was developed for use with a modern electrically driven compressed air and suction pump outfit, such as is

possessed, or should be possessed, by every physician doing throat work; and it is futile to attempt to do the operation with the various hydraulic suction devices, Potain aspirators, and the like. We must have sufficient suction to completely lift the tonsil out of its fossa and hold it suspended in the bulbous tonsil suction tube mouth until our snare loop completes the "shelling out" or enucleation process proper. As a rule, from 15 to 20 inches of suction is ample for this work; but our air pump should have a little more suction power in reserve against the day when the parts become more or less worn. Proper lubrication of our air pump is an absolute necessity, if we are to secure satisfactory day-in and day-out suction service. As a rule, the light, so-called "portable", air pumps are too flimsy in construction to stand up to the heavy-duty required with suction tonsillectomy. A good air pump then is an absolute essential; and this should be equipped with pressure gauges; compression and suction regulation devices; a vacuum reservoir bottle of from one-half pint to a pint or more in capacity. While the operation can be performed without it, I regard a foot-switch for start and stoppage of our air-pump motor as worth its weight in gold to the suction tonsillectomy operator; this renders the operation truly a "one-man job"; puts our suction under the immediate control of the operator, without the intervention of any second party, nurse or assistant; and leaves both hands free for operative usage, with our eyes trained steadily on the field of operation. These motor-control foot-switches may be either electrical or mechanical in type; and applicable to practically any type of air pump on the market.

Our suction pump should be protected against suction of foreign matter (blood, pus, mucus, tonsil exudate) into the pump proper, by a vacuum reservoir bottle placed at any convenient point in the rubber tubing circuit between the tonsil suction tube and the pump; this not only protects our pump; but where operation is under general anesthesia, as in children, serves as a very convenient reservoir for any blood or mucus to be aspirated from the operative field; some air pump outfits have this as a built-in feature; and to others it has to be added.

No change has been found necessary or desirable in the tonsil suction tubes proper; but with increased study the manufacturers are furnishing a very satisfactory tube. Manufacturing rights were lodged with one company, who agreed to adhere to proper design and to submit samples of the product from time to time for

personal approval. This is the only way to insure proper type surgical instruments in any field; where every Tom, Dick and Harry of a surgical manufacture is free to put out his idea of a surgical instrument, chaos is the result insofar as uniformity and quality of instruments are concerned. Several poorly made and generally unsatisfactory imitations of this tonsil suction tube have been submitted for inspection; by purchase direct from the manufacturers, or from high class surgical distributors, the operator is assured at all times of the genuine tonsil suction tube for this operation. Suction tubes of glass have been adhered to, in preference to those of metal, which, while unbreakable, destroy the high visibility throughout the operation attained with the clear glass tube. Breakage troubles with the present tube have been practically nil, and there is no occasion for breakage with proper technic. The operation is not a strong-arm procedure, but one of delicacy and precision. Some few operators prefer to control their suction with the finger held over a hole drilled in shaft of the suction tube; but the simple slip-off connection between the suction tube and rubber tubing circuit to pump has proven so satisfactory under all conditions that the shaft hole tube is not recommended. Several operators have elaborated upon the principles of suction tonsillectomy, with more or less complicated snare-tube instruments in metal, joined together; but these add nothing to the simplicity, rapidity or efficacy of the operation; but tend to the contrary. Simplicity was the keynote in development of suction tonsillectomy technique. While the many suggestions from various operators as to improvement in tube design, technic, etc., have been gratefully received; and most carefully studied out both by the writer, and by the manufacturers; they have not as yet been found desirable of addition to the original technic. Likewise, the various difficulties found by beginners with the different stages of operation, have been given most careful study; and many personal letters have been written in explanation of the different steps in operation. Having been in a way sponsor for the operation, the writer has felt it more or less his duty to see that operators who took up the new operation, and found difficulties, real or only apparent, should be set aright.

While the operation can be performed, and is performed with practically all types of tonsil snare, it has been found that snares of the ratchet type, such as the Pierce-Mueller, Beck-Pierce, or Beck-Schenck, as it is variously called, are best adapted to this operation. Instantaneous enucleation is possible, and is largely

employed; the writer, however, prefers the slower ratchet enucleation; and to this feature lays the practically bloodless nature of his tonsil work since developing suction tonsillectomy. A few seconds saved in rapidity of enucleation is not necessarily a gain if many minutes are later used to check bleeding. The ratchet-enucleation is rapid enough to suit anyone who desires to do good, clean work.

Ether by the drop method from a Simplex anesthesia arm, has given best results, where general anesthesia is employed, as in children. Our endeavor has been to have the patient sufficiently anesthetized: and then to complete our operation, before more ether would be required to keep the patient sufficiently under; this gives us a very brief anesthesia, with none of the bother or confusion of re-application of the anesthetic from time to time to enable completion of the work.

For local anesthesia operation, which is the method of choice in all but children, we would respectfully recommend the anesthetic combination recently suggested by the writer, in an effort to combine satisfactory operative anesthesia with a more or less lasting post-operative anesthesia over the period of convalescence.

The nose and throat of the patient is first thoroughly sprayed with an anesthetic spray of 4 per cent anesthesin, combined with other mild anesthetic medicaments, such as menthol, phenol, thymol in a bland oil; this tends to markedly diminish throat sensibility, and paves the way for 5 per cent cocain surface anesthesia by swabbing; this is followed by injection about the operative field of a solution of equal parts of novocain, ½ to 1 per cent; and quinin and urea hydrochloride, ½ to 1 per cent. This solution should be freshly prepared each day; to it may be added 8 to 10 drops to the ounce of adrenalin 1-1000 solution at the pleasure of the operator. The writer does not use adrenalin, for the reason that the operative field is clear to start with; and usually remains so, with proper technic; if any bleeding is to occur in a given case, the writer would prefer to have this occur at time of operation, when all needful hemostatic apparatus was at hand; rather than have a slow oozing develop later after the constricting effect of the adrenalin has worn off of the smaller capillaries in the denuded area of tonsillar fossae. Unquestionably, the worst feature of tonsil enucleation, from the standpoint of patient, is the pain and soreness of the throat the first two or three days after enucleation. If we can in any measure diminish this suffering, it is a welcome step forward. Many operators have noted that convalescence after suction tonsillectomy is

only about half that following tonsil enucleation by the older methods; in short, the vast majority are quite comfortable and able to take nourishment easily after the first two or three days. Our novocain gives a very satisfactory operative anesthesia; and the addition of a weak quinin and urea gives a more or less complete anesthesia of the parts for four or five days after operation, without any of the deleterious effects found with quinin and urea when used in such stronger soluiton some years ago. Because of certain ill-effects when thus used, this valuable anesthetic drug fell completely into the discard for nose and throat work; and it has been with more or less temerity that the writer has ventured to remove it from the drug junkpile, and call attention to its value in tonsil work. Working independently, but along different lines, Martin, of Hot Springs, has also recognized the virtue of quinin and urea for tonsil work, when used in proper strength, and reports much satisfaction from its use, for diminution of post-operative sore throat in tonsil cases.

Returning to the operative technic proper: one of the most important features of the operation is to select the proper sized tube for the given tonsil. At the very commencement of work on a given case, the writer begins to carefully study the size of the tonsil to be attacked, so that when the enucleation stage is approached, he has obtained a quite accurate estimate of the exact size of that tonsil; and has selected the proper sized tube to employ. While apparently a very simple matter, this is a very important phase of the operation. If we employ a tube too small to completely incorporate the given tonsil in the bulbous head of the suction tube; it becomes a mechanical impossibility to completely lift that tonsil out of its fossa into the tube mouth; and when we go to enucleate, our snare loop is bound to slice the tonsil, leaving a nice stump to plague us. While this mishap with suction tonsillectomy destroys the perfect technic we would like to show the onlooking doctor, and delays us a bit, it is of minor import, and the beginner with suction tonsillectomy should not let it rattle him; but simply select the smaller sized tonsil tube and enucleate the stump, just as we would attack a tonsil stump left after some of the old tonsillotomy efforts of a decade or so ago. Where the Sluder operator has sliced a tonsil in this manner, it is almost impossible to Sluderize the slippery, flat stump; and some snare and dissection work was the only recourse, if we would leave nice, clean fossae. With suction tonsillectomy, correction of such a mishap is very simple; not that we should have such a slip in our technic; but if it does happen with the beginner, he should not feel that all is lost.

I think the tendency is for the beginner to employ too large a tube for the given tonsil; it is sometimes astonishing the size of tonsil the small and medium sized tonsil tubes will handle with proper suction. Very rarely does it become necessary to employ the largest size of tonsil tube; yet the beginner thinks he must do so; and then wonders why he takes up tonsil, pillars and all; if we find our tonsil is improperly taken up, or the pillars also taken up; it is a simple matter to release our suction grasp of the tonsil by disconnection of the rubber tubing from end of suction tube; and take up the tonsil anew; if we go ahead and bring our snare into play with the pillars also engaged in suction tube, we may or may not chew the anterior pillar up more or less in the process of enucleation; but pillar damage is absolutely unnecessary in any case; and when this occurs, is due to faulty technic. Where the pillars are close together, with small adherent or submerged tonsils, it is of much value for the beginner to employ a pillar retractor on the anterior pillar, and thus facilitate attack of the tonsil proper. The pillar retractor will rarely be found necessary, after the operator becomes at home with the technic. It is difficult to describe the exact method of tube application to each tonsil; like the art of swimming, there is a good deal of "just know-how" about it, which quickly comes with a little experience; in general, however, we carry our tube-mouth back into the pharynx under direct inspection, and hold it steady in a practically horizontal position with regard to the long axis of the body, the open tube mouth gently touching the tonsil to be enucleated; suction immediately draws the tonsil up into the tube mouth; with deeply submerged tonsils, we rather invaginate the tube-mouth between the pillars and over the tonsil, as suction is turned on; the inclined plane surfaces of the tonsil tube act very much as a double-acting wedge and push the pillars aside and away from the tonsil, which is promptly drawn out from between the pillars by suction. For the long tonsil, our tube-mouth is carried below and back of the tonsil proper; and then applied to the tonsil in an upward, forward and outward manner, almost exactly as the Sluder instrument is applied to these tonsils; this engages the lower lobe of the tonsil, and at the same time suction draws down and moulds the upper lobe, so that the entire tonsil is nicely taken up by the suction tube; some operators have imagined that on this type of tonsil, it would be necessary to remove in two or more pieces.

The operation is really at its best on badly adherent and submerged tonsils; in other words, the "hard" cases have no terrors

for proper suction tonsillectomy technic. When they encounter a badly adherent tonsil, many operators feel that they must first carefully dissect the tonsil from the pillars, before proceeding with the enucleation; if we are going to waste time with dissection work, we might just as well make it a snare and dissection operation. Careful study on this type of tonsil has shown that dissection efforts are not only unnecessary, but actually superfluous and time-consuming. On a properly engaged tonsil, our snare loop dissects the tonsil free from these adhesions faster than the eye can follow; and it is a matter of much satisfaction to the suction tonsillectomy operator to go into one of these badly adherent tonsils; and emerge a few seconds later, not only with a perfectly dissected and incapsule tonsil, but with both pillars standing out clearly and sharply, as though carved in sheer stone. In this feature of spectacularity, suction tonsillectomy shares honors with the Sluder at its best. It looks impossible; and the average beginner has an imperative urge to whip out a scalpel and dissect some, but if he will restrain this tendency, and put more study on the proper engagement of the tonsil in the suction tube, the adherent tonsil problem will no longer be a problem after a little experience with the technic.

It is true that we sometimes encounter tonsils with very dense, fibrous adhesions, where it looks impossible to get them out cleanly without some dissection—I refer to those small, flat, badly adherent and submerged tonsils where the average Sluder operator takes one regretful look; and straightway betakes himself to some form of snare and dissection attack—in short, the type of tonsil the average operator cannot "get" with the Sluder. Suction tonsillectomy technic here is identical with that on other tonsils, with the exception, that if the adhesions appear unusually dense and fibrous, it is best to allow suction to pull on the tonsil a little longer than usual, before bringing the snare into play. Under this prolonged suction, the adhesions will gradually stretch, and slowly but surely, our tonsil will be seen to be lifting out of its fossa, and into the tube-mouth. Many operators of limited experience with the technic may doubt this phenomenon; but if they will just practice upon a few tonsils of this type, they will readily see that all tonsils truly look alike to suction tonsillectomy. "Really remarkable" is the way one enthusiastic operator describes his experiences with adherent and submerged tonsils. On stumps after old tonsillotomy has been performed, these will often be found more or less submerged and bound down by dense adhesions. If attacked as above described,

they will not be found to present any undue difficulty as to clean enucleation.

Lung abscess after suction tonsillectomy has been practically unknown; this does not necessarily present conclusive proof as to the aspiratory origin of lung abscess after tonsillectomy; but taken with the fact that this complication is usually found after a general anesthesia operation, it does point out the desirability of "vacuum-cleaning" each tonsil prior to enucleation by any method. In both the Sluder, and snare and dissection operations, it is common to see considerable amounts of pus and tonsil exudate squeezed out of the tonsils in the course of operative manipulation; and under general anesthesia this highly infective material can easily be aspirated into the upper air passages; this danger has been recognized by the presentation of suction devices to place below the tonsil to collect this exudate and pus; and in one instance, by the development of a Sluder-type instrument with a sort of rubber cup attachment to collect this pus and exudate as it is squeezed out of the tonsil at operation. Suction cleansure of the tonsil prior to operation is so simple, painless, rapid and generally satisfactory, that whatever the method of tonsil enucleation employed, the writer has strongly urged that all tonsils be suction cleaned prior to operation. As a therapeutic measure on pathologic tonsils, where for any reason enucleation is refused or inadvisable, periodic suction cleansure should be given far more widespread consideration and close study, than it has to date. If there is anything to Professor Bier's hyperemic theory of treatment, its possibilities from a tonsillar standpoint should be carefully evaluated and checked up from a bacteriologic standpoint in particular.

To return to our field, however: A point where many operators fall down is that after the suction tube has been properly applied to the tonsil and we are ready for snare action, there is a tendency to pull or exert traction on the suction tube; this often has the effect of pulling the suction tube off the tonsil; or at least partly destroying our vacuum, and disengagement of a portion of the tonsil. After the suction tube has been applied to the tonsil, it should be held firmly but gently *in situ*, with no traction or manipulation of any sort thereon: the function of the suction tube is simply to lift the tonsil out of its fossa and hold it suspended in the tube-mouth, while our snare loop is carried over bulbous head of suction tube and tightened down in back of the tonsil to complete the enucleation. This done, the function of our suction tube is at an end

save as a receptacle for the enucleated tonsil, with its prior-evacuated content of pus or exudate. Again, as the snare loop is carried over the end of the suction tube and tightened down in back of the tonsil, there is a tendency to not only tighten home the snare loop, but also unconsciously to pull the entire snare towards the operator; right at the junction of the tonsil and tonsil tube, this snare pull has a tendency to slide the suction tube off the tonsil, especially if our suction is weak and the tonsil small and flat. As with the tonsil tube, absolutely no pull or traction should be made on the snare itself; instead, as the snare loop is carried over the end of tonsil tube in preparation for tightening down, the canula end carrying snare wire loop should be carried gently but firmly directly outwards behind the anterior pillar; and then the snare loop tightened down; in this manner, we avoid any traction of the snare at the tonsil-tube junction posteriorly; and have our tonsil firmly engaged internal to the snare loop, beyond any possibility of its escape prior to enucleation. With proper suction, and careful observance of these points, no difficulty will be encountered at this stage of operation.

After the tonsil is firmly engaged by the tightened down snare loop, the tonsil tube is held by the hand holding the snare, parallel to shaft of the snare; while the disengaged hand completes the ratchet enucleation of the tonsil. In this way, we use the tonsil tube as a receptacle for the enucleated tonsil; and also prevent the tonsil tube falling out of the mouth as the tonsil is enucleated, with possible breakage of tube from striking on some hard object close to operative field. In one case, the tube fell out of the mouth as the enucleated tonsil came free; and swinging in a wide arc, came up against the side of air pump cabinet; with prompt breakage of a perfectly good tube. If the tonsil tube is held as described at this stage of operation, no untoward tube damage is done, as in the instance described.

The operation is difficult in very small children; any tonsil operation is for that matter, as the operative field is so small that instrumentation is limited. With a fairly large tonsil and small throat there is hardly room for the bulbous head of even the smallest size tonsil tube in between the two tonsils; in addition to which the uvula has to be accounted for; in these cases, the smallest size tonsil tube is used, and carefully carried into the throat and gently pushed over the tonsil before suction is turned on at all; the tonsil in tube takes up hardly any more space than the tonsil did at first;

and as the structures are soft and spongy as a rule in young children, this manipulation can be accomplished without undue difficulty. After the first of such tonsils is removed, more room is made and removal of the second tonsil more easily effected. On these small children, more care has to be taken to see that the uvula is not engaged or pulled in as the snare loop is carried over the tonsil tube; otherwise, the technic is the same as with older patients.

A mouth gag is employed in the general anesthesia cases, usually one of the Denhardt type; but not employed with local anesthesia work.

It is hoped these passing remarks may be of value to those taking up the work. Some few operators have taken one fleet "theoretic" look at suction tonsillectomy, and forthwith decided it couldn't be done. Some few have attempted an operation or two; either failed to follow the technic, or attempted it without proper equipment, and failed to get results. Operators who have employed snare and dissection for years, or who have become highly efficient Sluder operators, have decided they were too old dogs to learn new tricks, and have been content to follow on their well-beaten paths.

The vast majority of operators, however, who have taken up the new operation with an earnest desire to see just what was in it, and who have realized that no matter how simple an operation is, experience is necessary to perfection in technic; have gone forward and found it good. It has naturally been most gratifying to note the many enthusiastic comments on the merits of suction tonsillectomy; and to know that one's faith in the procedure has been so fully justified. Naturally all operators have not found the operation to their liking; we could hardly expect that; but where an operator has taken up the operation with proper equipment, and with proper technic, and determination to see it through to sufficient familiarity therewith, the merits of the procedure have been clearly demonstrated. Perhaps the morrow will find all of our present-day tonsillectomy techniques relegated to the rear by newer and better methods; but and that come to pass, we can one and all take pleasure in our efforts, large and small, to build unto that perfection which must ever be the goal of the earnest worker in every field.

ANTRUM INFECTIONS AS AN ETIOLOGICAL FACTOR IN REMOTE PATHOLOGICAL CHANGES.*

DR. F. E. V. SHORE, Des Moines, Ia.

While attending Sir Morrell Mackenzie's clinic in London in 1890, I chanced to meet a doctor from Morris Manitoba, who had been under the personal observation of Sir Morrell for six months for a condition which he had finally diagnosed as sphenoid abscess, and for which he subsequently operated with a fatal termination. It is quite apparent the world's highest authority at that time was not in possession of the knowledge those of modern times would deem necessary for the correct diagnosis and treatment of nasal accessory sinus infections.

Since his time, however, each year has witnessed added knowledge of their importance, the diagnosis of pathological conditions occurring within their cavities, the transmission of these pathological changes to remote parts, and finally the successful treatment necessary for their relief.

The increased facilities of diagnosis have demonstrated extensive distribution of diseases involving these parts; and as our observation widens, we cannot refrain from shuddering at the sacrifice of human life in the recent past, as the result of our very limited knowledge of the remote diseased conditions which have had their origin in these sinuses. It is true the "flu epidemics" of 1889, 1917 and 1918 are responsible for the wide distribution of these infections, but many antedated the first flu epidemic, and many others occurring since that time are not traceable to those epidemics. It is quite probable our public swimming pools have acted largely as general distributors, as it is a matter of general observation the frequency with which infective conditions follow a plunge in some well advertised pool.

Before proceeding to a discussion of the subject under consideration, I desire to call your attention to the methods of diagnosis, and to place myself on record as to the value of each. The foremost of these measures is the X-ray, and upon its findings, the vast majority of decisions are rendered as to the presence or absence of pathological changes. As a means of determining the conditions of the

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antrum, I consider it misleading, unreliable and productive of a great wrong to the patient, in establishing a sense of security where negative findings are obtained, when none but the gravest conditions exist.

I have repeatedly proven the correctness of this statement, and have in mind one case in particular where grave complications had resulted from too great a reliance on negative antrum findings. I shall refer to this case more in detail later.

This I have not found to be the case with the frontal sinus, as I have always considered it a great aid in clearing up and confirming a diagnosis of abscesses in this region. I can hardly conceive of any operator performing an intranasal frontal sinus drainage, without first having determined the actual presence of a frontal sinus, its size, shape and relation to surrounding parts. The X-ray has demonstrated the absence of a frontal sinus in three of my patients, the absence of which was verified in one at post-mortem. It is at once apparent the incalculable damage one might inflict on a patient in efforts to enter a frontal sinus which did not exist.

Transillumination is but a minor aid and only suggestive at best. This is especially true of the antrum where I have repeatedly demonstrated the cavities clear under all shades of illumination, while they concealed half a dram of pus within their walls; others failed to illuminate, giving a positive finding owing to density of walls or floor, notwithstanding they contained nothing within.

The only reliable test for antrum infections is the irrigation of that cavity through the natural opening, and the submission of its contents to the laboratory. You can obtain more positive knowledge in 10 minutes by this means than it is possible to obtain from transillumination and skiagraph where a guess at their interpretation is all you can hope for. It is probably immaterial whether you force the antral contents out by pressure or withdraw them by suction, or as one of my conferees expressed it, "whether you are a 'blower' or a 'sucker'." However, in this class of cases I prefer being a sucker as I can entertain the mental satisfaction of knowing I am not blowing the patient's fieth to distant parts.

The admixture of blood with the antral contents as occurs when a puncture of the antrum is made, interferes with the macroscopical examination; and in those containing a small amount of discharge its presence may be overlooked.

Some three years ago while searching for the cause of an acute suppurative otitis media in a lad age 14 years, on whom a perfect tonsillectomy had been performed some years prior, I decided to

wash the antrum, and to my complete surprise obtained a dram of pus. This was done every other day for three washings with a complete cessation of the aural discharge, although no medication had been made to the ear.

I repeated the same treatment on others with similar results, so I concluded that if this were true in acute suppurative otitis media, I was dealing with the primary source of mastoid infection, and decided to put my conclusions to the test by irrigating the maxillary antrum in all cases of mastoiditis. The first case for investigation was one on whom four years prior I had performed a successful mastoid evisceration.

He now complained of right mastoid pain of increasing severity at night; mastoid tenderness on pressure and very marked deafness in each ear. He had a 2200 white blood count and the skiagraph, you will observe, shows decided mastoid changes. Each antrum contained about a dram of pus, and was irrigated daily for three weeks with normal salt solution, dried and a 2 per cent solution mercurochrome instilled. He received no other treatment, nevertheless the mastoid pain and tenderness rapidly disappeared; the hearing improved and the blood count became normal, so that at the end of four weeks I drained the right antrum, and one week later performed a similar operation on the left. Although more than two years have elapsed since the establishment of antral drainage, he has had no return of his mastoid symptoms.

A second one, whose skiagraph I present, with symptoms similar to the first, resulted in like manner—mastoid pain and tenderness permanently disappearing.

This experience encouraged me to examine the antri of all ear and mastoid infections, and especially those on whom a mastoidectomy had been performed.

One of these had had a very incomplete mastoid evisceration performed while a resident of Wisconsin. She was having pain in each mastoid with tenderness and fever. Each maxillary antrum was found filled with pus and although it was necessary to eviscerate each mastoid, it was also necessary to establish permanent drainage of the antri. She enjoys perfect health and expresses herself as having a new lease on life. I could enumerate many similar cases, but it will suffice for me to say that I have not examined a case of mastoiditis, acute suppurative otitis media, or one on whom a mastoidectomy had been performed who had not an infected antrum, and as a consequence of these observations I am convinced the antrum infections antedate those of the ear or mastoid. The frequent

recurrence of ear infections with involvement of the bone in a completely eviscerated mastoid case is thus easily accounted for.

From all that I have thus said you will observe I am relegating the tonsils to a very subordinate place. I should certainly advise the removal of pus infected tonsils and those whose presence is a nuisance and a danger, but I do not believe they are the essential sources of the remote infections for which they have been held responsible in the recent past.

Many of these antral infections are without symptoms directly referrable to the superior maxillary region, but manifest themselves in mastoid, frontal, temporal or occipital annoyances.

This was well illustrated in a case of recent date. A railroad employe had a cinder removed from his right cornea, Apr. 26, 1924. A week later he was sent to the hospital with a corneal ulcer at the point of corneal injury. He remained in the hospital twelve days, but was treated at various times for the ulcer until Sept. 26, when he consulted me. At this time he had in addition to the corneal ulcer a 70 m.m. eye pressure, and an opaque lens with vision nil. Eserine having failed to reduce the pressure, I did an iridecomy with perfectly satisfactory results; these, however, were of only three weeks duration, as he returned with a 70 m.m. pressure. I then removed the opaque lens with some loss of vitreous. Two weeks following the cataract extraction he complained of severe pain in region of left eye, for which the interne prescribed aspirin and later a hypo of morphin.

Upon examination I located the pain in the supra and infra orbital maxillary nerves with no involvement of the eye. On the following day he had a return of the pain which adhered closely to the 11 a. m. malarial type of manifestation. Notwithstanding the absence of pus in the nares, absence of darkness on transillumination or a history pointing any way to accessory sinus infection, I washed one-half a dram of pus from each antrum. He never had a recurrence of the pain. His antri were washed each alternate day and 2 per cent of mercurocrome instilled for two weeks. Congestion of the right eye continued, but was markedly lessened after each antrum treatment.

As there was considerable discharge from the antri a permanent drainage was established and one week after the last operation he returned to his home with no congestion of the right eye; normal vision left eye and but a trace of pus from left antrum. As to the part played by the sinus infections as an original factor in the infection of the corneal wound or the disturbance produced within the

eye, I am not prepared to say, but I am of the opinion they were incidental; however, I have not presented the case for a discussion of that particular phase.

The intimate relationship existing between infections of the sinuses and those of the eye have been elaborately dealt with by observers of recent times, but the antrum has not received the consideration its importance demands. Infections of the lens and sclera have not received a passing notice in their relation to antral infections. Some two years ago in a paper presented at Kansas City I advanced the theory of the bacterial origin of cataract in a large percentage of cases and observation since has confirmed that contention. A capsular cloud of variable degrees is one of daily observation and if its progress is not impeded may and does proceed to the formation of a lenticular cloud through degenerative changes of the capsular vessels. The removal of diseased tonsils, and apical abscesses will not suffice for the arrest of these process if the antri are permitted to harbor infective material of an inexhaustible amount. There are no infections of the eye that may not have their origin in the antrum and rarely, if ever, is the frontal ethmoid or sphenoid diseased without an existing infection of the antrum, which being to all intents and purposes a closed cavity situated as a terminal of the sinus sewage system, offers an inviting field for the propagation of the various species. One of the prominent symptoms of antral disease is the presence of a cough of different degrees of severity.

I recall the case of a physician's son who developed a cough, fever and sweats which caused the parents much concern least he was developing incipient tuberculosis. Physical examination and X-ray warranted the examiner in pronouncing him free from any such condition. He came to me for examination, and the presence of pus in his tonsils was readily established by slight expression. He returned for the evisceration of his tonsils, but before proceeding I decided to investigate the antri, one of which I found contained pus. A permanent drainage was established with prompt disappearance of all his untoward symptoms. He has never had his tonsils removed, is taking a college course and enjoying perfect health.

As an evidence of the extensive distribution of these infections, I shall refer to the history of a maiden lady, age 32 years, who complained to her attending physician of severe left frontal headache and a discharging left ear. At the end of two weeks' treatment the discharge ceased, but the frontal pain continued, though less severe. One week later she developed edematous left eyelids, pro-

ptosis of left eye and a recurrence of the ear discharge; she had a temperature of 104°, pulse 130, no chills, chest normal. The X-ray showed cloudy antri, cloudy left frontal, absent right frontal, slight mastoid cloudiness on each side. On the third day after the onset of these symptoms I was consulted. She had a temperature of 105°, marked left proptosis, left frontal pain, left retinitis. The preponderance of symptoms pointed to the left sphenoid as the probable source of her aggravated symptoms. I eviscerated the left ethmoid cells, opened the left frontal and sphenoid, and washed out each antrum. The cavities were all filled with pus. The operation failed to give any relief, and on the third day she died.

The post-mortem revealed a macroscopically, normal brain; no pus in left sphenoid or frontal; pus in each mastoid; each antrum; right ethmoid and sphenoid; localized infection of right pleura; and a complete absence of right frontal. The freedom from pus of the recently operated left frontal, ethmoid and sphenoid was a remarkable demonstration of the perfect drainage afforded by thorough operative interference.

I may also refer to the accuracy of the skiagraph in every detail. This is said by way of atonement for my previous remarks on X-ray.

If my observations have been correct, this was primarily a sinus infection, which if properly drained at an early stage, in all probability patient would have recovered.

There is one type of general infection where teeth and tonsils have been removed in startling numbers in attempts at locating its cause, but in the vast majority of cases the results have been disappointing, and the rheumatic patient is once more subjected to sweats and salicylate treatments.

Four years ago I had a 15-year-old patient with acute articular rheumatism, the bacterial origin of which I was determined to chase to its lair. I had his teeth, sinuses and mastoids X-rayed with negative results, and an examination of the nares revealed nothing out of the normal. A recurrence of the acute symptoms called for another X-ray of the teeth, and a filling was believed to be a possible cause; the filling was removed, followed by decided amelioration of the symptoms, only to reappear with the introduction of a temporary filling. From this it was quite apparent the tooth was the long sought offender, and it was extracted, but in place of the expected improvement, the rheumatic conditions grew gradually worse and developed an acute nephritis, with a very high blood pressure and almost complete urinary suppression. By the use of hot packs and

salicylates the grave symptoms quieted down and in due time he was able to take a drive, but the ablumin and casts remained, and the rheumatic condition was settling back for a steady grind.

Despite the X-ray finding and the negative findings in the nose I decided to irrigate the antri and found them full of pus. Improvement rapidly followed the daily douching and mercurocrome instillation in the antri, and ere long the casts and albumin disappeared from the urine. When the more acute symptoms subsided I established permanent drainage for each antri, with the complete disappearance of all rheumatic disturbances. Although three and one-half years have elapsed, he has had no recurrence of albumin, casts or rheumatism.

Frequently the rheumatic infection involves all the sinuses and the drainage of each becomes necessary before recovery can be hoped for. One such case was that of a young lady whose antrum I had washed one year prior, and at that time had advised permanent drainage. On this occasion she had been in the hospital three weeks with acute inflammatory rheumatism involving many of her joints. The Roentgenist was so positive of negative antri findings that a washing of each was necessary to convince him of the presence of a very serious infection of those cavities. Her antri were washed and treated daily in the usual manner until all acute symptoms had subsided when drainage of the antri was established, and later all the sinuses opened and drained. Rheumatic pains continued for some time, but eventually they all disappeared, and she recovered without cardiac or renal complications which so often bear evidences of the ravages of an unbridled bacterium.

I have one more citation to make before quitting this all important subject. It is that of a man, age 26 years, who consulted me for subacute attacks of rheumatism in knees, elbows and wrists. He had an extensive infection of all the left sinuses. I drained them all with complete disappearance of the rheumatic symptoms. For some unaccountable reason bony fibrous deposit closed the antral opening three times and each time the drainage was arrested. The rheumatic symptoms returned. I finally succeeded in making the drainage permanent and the patient has enjoyed entire relief.

I am thoroughly convinced more extended observation will corroborate these findings, and I cannot believe any internist is justified in feeding his patient salicylates and weakening him with sweats until the condition of the nasal accessory sinuses has been determined and their pathology corrected.

501 I. Nat. Bldg.

PSYCHOSIS RESULTING FROM TOXINS OF CHRONIC MAXILLARY SINUSITIS, COUPLED WITH LEFT HYPERPHONIA OF 8½ PER CENT.

DR. CLARENCE IDE, Long Beach, Cal.

Mrs. Elsa M., German descent, age 34 years, referred by her husband, a surgeon, had suffered for some time with a psychosis, which had demanded confinement to a sanitarium for some months. In addition there was complaint of severe recurrent headaches, with the pains over the vertex which we consider characteristic of sinusitis, as well as profuse purulent secretion from the nares. The skull and teeth had been radiographed and thorough physical examinations had failed to reveal the cause of the mental aberration, as reported by her medical attendant. This physician, who was present when the writer operated, remarked, I always felt sure the cause of the psychosis existed above her neck. The first examination, Mar. 5, 1920, showed the following: septum not deflected, middle turbinals not massive (free space between middle turbinals and lateral walls, no contact with septum). Pus in right superior meatus. Mucous membrane glazed.

On transillumination the left pupil and semilune were dark. The right less so, but not clear. The voice has a typical nasal twang.

Radiographs showed the maxillary sinuses cloudy.

Advised puncture and irrigation of maxillary sinuses for diagnosis. Washing of right antrum produced no discharge, but the flow of the fluid (from Yankauer wash bottle) was blocked as by thickened membrane or polypoid condition. Irrigation of the left antrum produced thick, ancient pus. This procedure was followed by pain in the teeth, eyes and head. Treatment by ichthyol packs, 50 per cent argyrol to antra.

Mar. 8, 1920: Irrigation repeated. No secretion from right side. From left argyrol stained mucopus. Ichthyol pack. Argyrol to antra. Pain down the neck followed this treatment.

Mar. 12: Did bilateral Canfield operation under ether. Antra curetted and packed with gauze.

Mar. 13: Removed small amount packing from right side. There was ecchymosis below inner canthus of O. D.

Mar. 14, 17, 22 and 24: Irrigated. Small amount of discharge.

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Mar. 26: Punched out edge of wall between antrum and naris to enlarge opening on left side.

Mar. 30, Apr. 2: Dichlorazene to both antra. There had been slight accession of discharge.

June 12: Reports three headaches since operation (three months) always caused by sexual intercourse. Gave belladonna for spastic constipation, also thyroid extract, ovarian extract, and pituary extract to combat endocrine imbalance.

On May 26th at refraction for glasses, the lids showed slight folliculitis, the pupils reacted to light and distance, the consensual pupillary reaction was positive.

The ophthalmoscope revealed pigmented areas, a scleral stretching at temporal border of each papilla.

Patient reported paralysis of accommodation as sequel to diphtheria in childhood.

Homatropine cycloplegia. Retinoscopy.

Accepted: O.D. + .75 with + 1.50 at 180, O.S. + 1 with + .50 at 180.

Prism O.D. 3° base up, O.S., 3° base down.

Muscles: Dist. Ex. ½°, L.H. 7½°; Near Ex. 11°, L.H. 8½°.

Extorsion O.D., 3°.

Parallax Test + dist. and near; cover test shows vertical recovery of O.S.

For reading a grab front was prescribed with prism 4° base in O.U. Whatever may be the opinion of some of the neurologists, I feel confident that this susceptible woman had suffered her psychosis from absorption of toxins from her maxillary sinuses with, in addition the unrelieved strain resulting from 8½° of vertical ocular muscle imbalance. The operation, prescription of proper lenses, and organotherapy brought relief. The patient was cheerful and bright, and confided to me that any suffering she had experienced since the operation was brought on by sexual intercourse, which she dreaded.

This patient had a brother who was mentally deficient, so heredity had its part in the causation of the psychosis.

917 Security Building.

A REPORT OF TWO CASES OF CHRONIC FRONTAL SINUSITIS.*

Dr. George L. Whelan, Philadelphia, Pa.

The unusual symptoms and sequelae of two cases in which the frontal sinuses were involved justify the presentation of this report.

The etiological factors concerned in infection in the sinuses are the same as those in other parts of the body. In a general way it may be said that what applies to one sinus is applicable to all the others. However, in considering the frontal sinus we must bear in mind a number of anatomical details and relationships.

Briefly we may say that the frontal sinus is a cavity situated in the diploae of the frontal bone, surrounded by diploic veins, fed by an immensely vascular network of external vessels, and connected with the origin of the superior longitudinal sinus and the dura by emissary veins. The frontal osteum empties into the nasofrontal duct, which is a narrow canal, while the outlets of the other sinuses are situated directly in the nasal passage. The nasofrontal duct may be occluded by swelling of the anterior portion of the middle turbinate, or by a high deviation of the septum. Therefore, if we have a general inflammation of the mucosa of the frontal sinus, due to the conformation of the anatomical structures of this region, the mucosa lining this sinus is liable to become the seat of chronic infection, which would not necessarily occur under similar conditions in the other accessory cavities. It would seem that most of the frontal sinus affections arise as a result of pressure or infection from structures outside the duct.

Among the suppurative complications which may occur as the result of frontal sinus infection is frontal lobe abscess; meningitis may also occur, as well as the interesting and obscure complication of osteomyelitis, whether by the external or intranasal route. It is therefore evident that the anatomic structure and relationship are most favorable for a rapid spread of infection, and that only a lowered resistance is necessary to initiate activity.

CASE REPORTS.

Case 1: Mrs. A. T., age 60 years, colored, a cook by occupation, was referred to Dr. Ross H. Skillern's clinic, Medico Chi, on Nov. 10, 1923.

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*Read before the Philadelphia Laryngological Society, May 5, 1925.

History: At the age of 27 she was treated for what she describes as pain over right frontal region, coincident with head cold, such attacks occurring once or twice yearly, with gradually increasing frequency. Sept. 1, 1923, she developed marked swelling, pain and tenderness, with severe headache, over right eye. This condition was treated as a "brow abscess" in a Baltimore hospital. The treatment, consisting of incision and drainage over the region of inner quadrant of the upper lid, was followed by temporary relief.

Roentgenological Findings, Nov. 8: Both frontals showed haziness, indicating that they should be investigated for possible exudate. The sphenoids were clear; the ethmoids on the right side densely occluded with exudate; the maxillary sinuses opaque, particularly the left.

Blood Wassermann: Negative.

Urine Analysis: Negative.

Nov. 10: Rhinoscopic examination discloses yellowish pus filling the nasal fossae. Antral washings show fetid yellowish pus. The right frontal sinus was opened intranasally; this was followed by an increase of the discharge, though some of the pus escaped through the original incision in the eyebrow.

Nov. 22: A Caldwell-Luc operation performed on the right side was followed by some improvement in the condition of the right frontal. Lavage of left maxillary sinus shows only slight improvement with relapses.

Dec. 18: Pain persists over the left frontal region; infraction of the left middle turbinate, and introduction of a probe discloses yellowish pus. Treatment did not seem to have relieved the condition.

Jan. 9, 1924: Denker's operation performed on the left antrum was followed by cessation of left frontal symptoms, and very little discharge from the left side. From the right side of nose, however, there is still some discharge, and the fistula continues to discharge freely.

July 23: Frontal operation was decided upon, to be modified as might be indicated by the findings. The sinus was full of pus, granulation tissue and polypi. One area of granulation tissue seemed more prominent than the rest. Since, in this area, the posterior plate receded, it was carefully curetted; during this procedure there came into view a smooth round opening about the size of a 25-cent piece, in the posterior plate; the edges of this opening were formed of solid bone; the small projection, referred to above, was dura which was firmly adherent to the bony margins of the perfora-

tion. The area was protected with sponges and the operation completed.

After recovery from the operation there was only a slight discharge and, occasionally, slight headache. The cosmetic result was good. On neurological examination nothing abnormal was found, notwithstanding the hernia cerebri. Apparently the process was well walled off by nature before the operation. The prognosis is now good, since the area of exposed dura is free of pus, and sixteen months has elapsed since the last operation.

Points of interest in this case are the apparent resistance of the dura to infection and the subsidence of the left frontal infection after the Denker operation, which shows the possibility of the frontal becoming infected from the maxillary sinus. This is easily understood when one bears in mind the fact that the patient is not always in the upright position and that during sleep the frontal and maxillary sinuses are approximately on the same plane, thus making possible an extension of the infection. The frequency of this mode of extension of an infection would seem to depend entirely upon the configuration of the maxillary osteum, riatus semilunaris and frontal osteum. However, this route of infection, as described, is not the usual one, inasmuch as maxillary involvement, when it coexists with frontal infection, is usually the sequela of the latter rather than its cause.

Case 2: R. .M, a laborer, age 23 years, was referred to Dr. Ross H. Skillern's clinic, Sept. 18, 1924. He had been employed in a New Jersey lead works during a period of six months, two years ago. Since then he had been working irregularly.

There has been, for the past two years, frequent head colds accompanied by headaches. Three weeks ago the patient developed a cold, which was followed by left frontal headache. On admission there was proptosis and tenderness over the left supraorbital region.

Examination: Intranasal examination revealed a great quantity of yellowish pus coming from beneath the middle turbinate and between the middle turbinate and the septum. The right side was practically negative, excepting that the middle turbinate was boggy in appearance. Antra washings were negative.

Roentgen examination shows the left frontal sinus to be opaque, the sphenoids clear, the ethmoids on both sides occluded with exudate, and the maxillary sinuses clear.

Blood Wassermann: Negative.

Urine analysis: Negative.

Sept. 20: With the patient under cocain-adrenalin anesthesia, the left middle turbinate was removed and the left frontal sinus opened intranasally. Following this, the headaches were relieved and there was a subsidence of tenderness and swelling in the supraorbital region.

Sept. 29: Swelling about the size of a ten-cent piece was observed over the inner third of left frontal sinus, also a swelling about the size of a large bean was seen about 5 m.m. above the inner canthus of eye; both swellings were somewhat reddened and showed fluctuation, and there was marked sensitiveness in the superior internal angle of the orbit. Anterior rhinoscopy revealed an abundance of yellowish pus in the left middle meatus; the right side was practically negative. With the patient under general anesthesia, an incision was made along the left brow and the periosteum was raised in the direction of the median line. At about 1 c.m. from this line a small zone was found in which the external table of the sinus was necrotic. The pocket was opened, part of the anterior inner frontal wall was resected, and a small quantity of pus and granulation tissue were evacuated, after which the area was curetted. An incision was then made over the fluctuating area below, a small amount of pus was evacuated and free drainage was established; this incision did not join the initial incision above. A catheter was introduced into the frontal sinus and anchored with a silkworm-gut suture; it was allowed to remain for six days. The patient was discharged Oct. 6, with the condition considerably improved.

Oct. 17: The patient was readmitted with a septal abscess on the right side. A window flap was resected in the mucous membrane along the base of the quadrilateral cartilage and drainage was established. This procedure was followed by improvement. The patient asked to be discharged Oct. 20.

Oct. 21: An edematous swelling developed over right frontal region. Headaches, increasing in intensity, again occurred.

Oct. 22: The wound on left side was reopened and was found to be clean with ample drainage. An incision was made to effect communication with the edematous area over the right frontal region; this area was thoroughly inspected and drainage was established. No pus was found.

Oct. 23: Patient became lethargic and developed convulsions and Kernig's sign. Spinal puncture showed the cerebrospinal fluid to be under pressure; 25 c.c. were withdrawn. The cell count was high—372 per cubic millimeter; sugar was present; the proteins

were greatly increased; the fluid was negative for organisms. Five hours later 25 c.c. of a 1 per cent solution of mercurochrome in sterile distilled water was administered intravenously. Improvement soon followed and the next day the patient recognized his family and could take food.

Oct. 24: The results of spinal puncture were practically the same as given above. No organisms were found.

Neurological examination (Drs. Weisenberg and Patton): The symptoms are indicative of a bilateral cortical lesion, more marked on the left side. The probabilities are that the patient has a bilateral frontal lobe involvement. Taking into consideration the serology, operation is practically hopeless. Roentgenograms show no evidence of abscess about the cranial vault, no evidence of bone disease, rarefaction or absorption. There is diffuse density about the ethmoid region suggesting exudate on both sides; the mastoid processes on both sides are clear; the sphenoids in the lateral view are hazy.

Oct. 27: The patient's condition is improved, there is less difficulty in arousing him, convulsions occur only occasionally.

Oct. 28: Marked improvement continued.

Oct. 29: At 1:15 a. m. the patient requested water, which he took unaided; twenty minutes later he died.

Autopsy (by Dr. Jonas) disclosed a deeply congested and opaque dura. On incising the dura yellowish pus was seen to be diffusely distributed over the frontal lobes of the brain, and in the longitudinal sulcus. The posterior walls of frontal sinuses were found to be intact and on opening were seen to be free of pus. The cribriform plate was also intact, but on removing the roofs of the ethmoids pus of the same character as that found on the frontal lobes was revealed. The sphenoids were similarly involved. The cavernous sinus showed nothing of importance. There was no evidence that the brain had been broken into through operative procedures.

Diagnosis: Subdural abscess.

It would seem that the virulence of the organism, at least in these two cases, was the most important factor determining the final results; as in Case 1 the dura was practically bathed in pus while in Case 2 the organisms apparently gained access to the dura through the emissary veins, the result being the production of a subdural abscess.

257 South 16th Street.

TWO CASES OF UNSUSPECTED FOREIGN BODY IN THE LARYNX.

DR. PORTER STILES, Birmingham, Ala.

The following cases illustrate the unreliability of negative foreign body histories, as well as the importance of routine X-ray examinations in the presence of respiratory tract symptoms.

Case 1: O. M., female, age 12, was admitted to the Hillman Hospital May 13, 1925, as a case of probable laryngeal injury. She complained of moderate pain in the throat and anterior portion of the neck. She stated that two weeks before admission, while playing, she ran into a wire clothes line, which struck the front of her neck with such force as to cause her to fall down. She was short of breath for a moment after the accident, but had no other symptoms, and soon resumed playing. The following day her neck was somewhat tender, and a day or two later she began to notice a slight but fairly deep seated pain in the throat and neck, constant in character, but more noticeable on swallowing. The tenderness shortly disappeared, but the pain persisted with some increase in its intensity. She coughed from time to time, but has had no severe paroxysms.

On examination the voice was noted to be slightly hoarse, but breathing was quiet and there was no dyspnea. There was no external evidence of injury to the neck or larynx. Inspection of the pharynx and tonsils revealed nothing abnormal. Examination of the chest was negative. An X-ray plate was then made and it showed a straight pin in the larynx, lying in the sagittal plane, with the point anterior.

Without anesthesia, the larynx was exposed with the Jackson speculum, and the pin point was found to be imbedded in the mucous membrane of the anterior commissure just between the vocal cords, while the head rested above the cords in the posterior commissure. There was very little inflammation present. The pin was removed without difficulty, and the patient was shortly discharged well.

She was questioned after removal of the pin, but could not recall ever having had a pin disappear from her mouth, nor did she recall

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having had one in her mouth at the time of the accident. However, in view of the history, it seems reasonable to presume that the pin was in her mouth at that time, and that in the excitement of the moment, its disappearance escaped notice.

Case 2: W. D., male, age 6 months, was admitted to the Hillman Hospital May 25, 1925, with the following history: one week ago

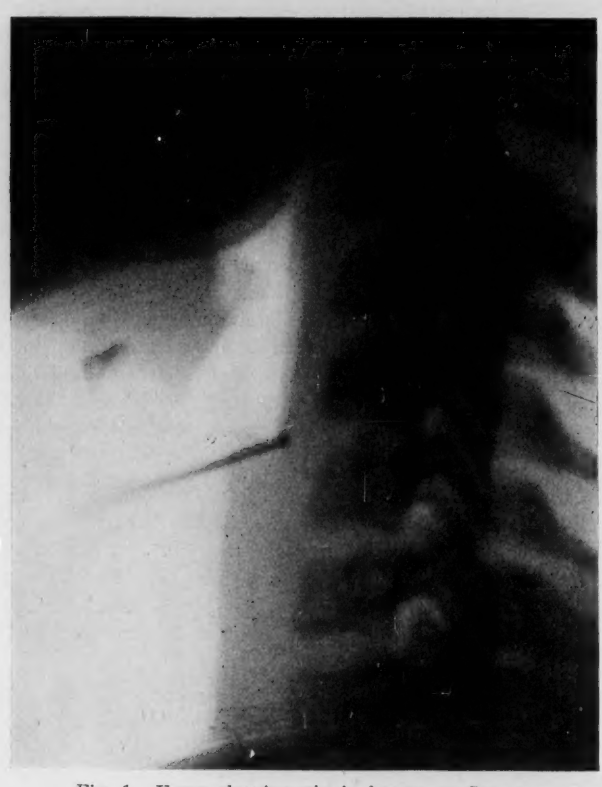

Fig. 1. X-ray showing pin in larynx of Case 1.

began to be fretful and restless, and seemed disinclined to nurse. The following day coughed occasionally, breathed more rapidly than usual, and seemed to have an acute cold. During the next three days continued to cough from time to time, and breathing became noisy and more rapid. A physician was consulted and he decided that the baby had a beginning pneumonia. In spite of

treatment its condition grew gradually worse, and the day before admission another physician was called, who advised taking the baby to the hospital for examination, as he found evidences of respiratory obstruction rather than pneumonia. There was no history suggestive of foreign body nor of exposure to diphtheria.

On examination the baby appeared quite ill. The temperature was 103°, pulse 140 and respirations 50. There was well marked dyspnea with noisy respirations and some indrawing of the epigastric space. The tonsils were fairly large and red, but no membrane nor follicular inflammation was present. Breath sounds were loud and harsh, and coarse rales were heard over both lungs. Expansion was equal and the percussion note showed no impairment over either lung. An X-ray examination was immediately made and it showed an opaque foreign body, apparently in the larynx.

Without anesthesia, the Jackson speculum was introduced, and a short iron bolt with a large, almost flat head was found in the

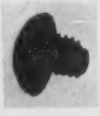

Fig. 2. Bolt removed from larynx of Case 2.

larynx, the head lying on and between the ventricular bands, and the shaft resting in the interarytenoid notch, protruding into the hypopharynx. The mucosa of the larynx and hypopharynx was quite swollen and excoriated. The bolt was easily removed with alligator forceps, and on examination was found to be of the type used in assembling steel filing cabinet units.

After removal of the foreign body the dyspnea was considerably relieved, but there remained sufficient obstruction due to the supraglottic swelling to require close observation for a time. The following day the temperature came down to normal, and the general appearance of the child was much improved. After four days, the dyspnea had entirely disappeared and the patient was discharged and has had no further trouble.

After considerable questioning, an older child admitted having placed the bolt in the baby's mouth as a pacifier shortly before the first symptoms were noted, and when it slipped from her fingers and disappeared from view, she was afraid to make it known.

510 Empire building.

LUNG ABSCESS, PNEUMOTHORAX, SEQUELAE ESOPHAGEAL FOREIGN BODY.

Dr. E. Lee Myers, St. Louis.

The following case report is made in order that it may be of some help to others doing endoscopic work. An autopsy would have made the case more instructive, but such was impossible under no ordinary efforts.

Case Report: Mrs. P., age 30 years, spare build. Five weeks before our first examination, had attack of "flu", which necessitated her being home, with great prostration, and a severe cough but not completely bed-ridden.

Mar. 18, while eating spareribs and sauerkraut, felt something stick in her throat.

Mar. 24, consulted her physician, Dr. R. Emmet Kane, who did no instrumentation. Case referred to the writer. X-ray and fluoroscopic study by Dr. Gray C. Briggs, which led us to suspicion a foreign body in the region of the cricoid, but after considerable thought, we believed that we were dealing with a "negative to the X-ray" intruder; however, under a local esophagoscopy lasting twenty minutes, we were unable to remove an impacted bone, located benath the cricopharyngeus on the left side. Patient put to bed in good condition, and large doses of bismuth subnitrate given, in conjunction with the physiological dosage of belladonna to allay spasm. While awaiting the second esophagoscopy, the problem was worked out several times on a small dog.

Mar. 25th to 28th, temperature remained at 99 2-5.° No emphysema or neck stiffness present, patient swallowing soft diet and resting fairly comfortable.

Mar. 28, second esophagoscopy, under ether. A slough found in left pyriform fossae anteriorly. No foreign body found on examining entire esophagus through right pyriform. Some blood present during tubing, which was quickly handled with suction. Careful dilatation done with Hill-Dean and Seifert's esophageal dilating speculum did not reveal any spicule of bone. Duration of tubing, forty minutes. Large doses of bismuth continued.

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Mar. 29, patient complained of severe pain in right side chest in early morning. Throat very sore.

Mar. 30, good night, eating soft diet with relish.

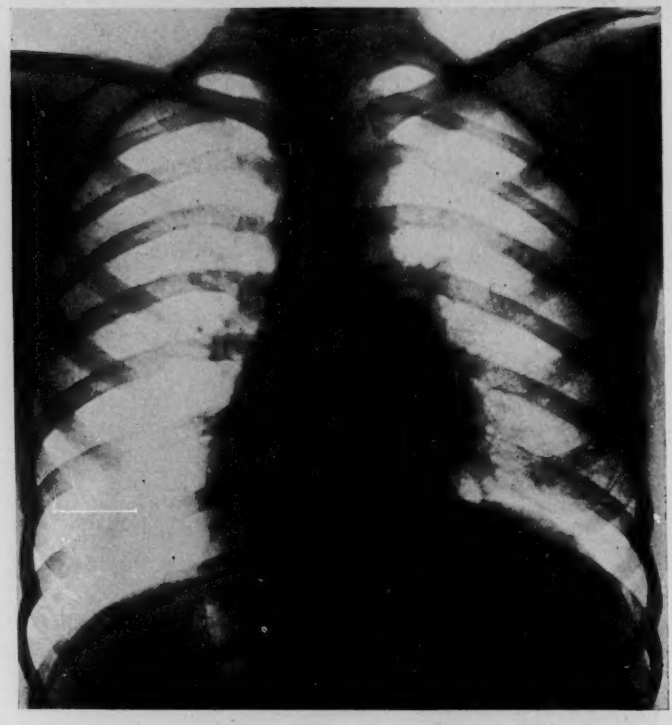
Mar. 31, good night, soft diet. Later on this date complained of chest being sore.

Apr. 1, eating soft diet. Patient insisted upon leaving hospital, although in the last two days, patient has had a temperature around 101.° Her swallowing function perfectly normal. No symptoms of perforation can be made out. Tucker's sign negative.

Apr. 2, patient at home, found her swallowing normally. Temperature 100.°

Apr. 4, family phoned, said patient swallowing normally. Temperature 100.°

Apr. 6, family doctor found patient coughing severely, odor from sputum terrific. Temperature 102.° Examination made by X-ray revealed a middle lobe lung abscess. Bismuth meal did not reveal a tracheoesophageal fistulae. Patterson's capsule did not hesitate on

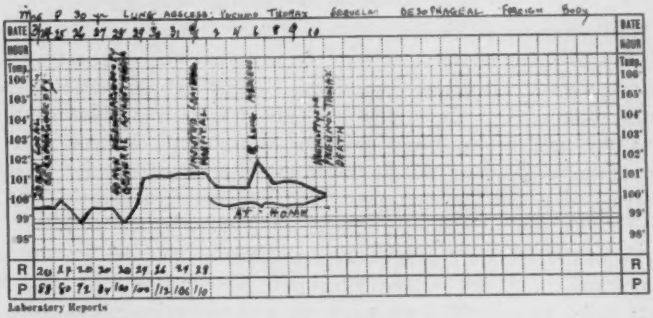


descent. Bubble sign of Killian-Iglauer not present, no thickness of posterior wall of esophagus.

Apr. 8, patient remarkedly better, family refused to allow patient to go to hospital in order that lung suction and mapping might be done.

Apr. 9, patient much better this morning, coughing very little, practically without odor. Temperature 100 4-5.° Swallowing perfectly normal. Patient has enjoyed a good day, sitting up in bed most of the day.

Apr. 10, at 2:45 a. m., husband accompanied wife to the toilet, and while straining at stool, had a severe coughing spell, accompanied with considerable hemorrhage. Later in morning, about 4 o'clock, I found patient in shock, due to an acute pneumothorax, from which she did not recover, despite all efforts at stimulation, *i. e.*, caffein, spartein, morphin, hot packs, etc. Oxygen being unavailable, a valuable aid was missing.



Laboratory Reports

CONCLUSIONS.

1. An impacted foreign body in esophagus which seemingly defied safe extraction, upon second examination being missing, implies that large doses of belladonna had relieved spasm of cricopharyngeus, and bone had removed itself.

2. Foul odor of sputum and roentgenological evidence of lung suppuration in so short a time after both endoscopies can hardly be traced to either of these or foreign body, unless it be of lymphatic origin.

3. Presence of tracheoesophageal fistulae cannot entirely be differentiated as patient did vomit up foul smelling material; however, no evidence was found on barium meal test.

4. Unusual hemorrhage in course of lung abscess, with acute pneumo-thorax is seen occasionally in lung suppurations, but not as a result of esophageal foreign bodies.

5. Entire absence of any symptom that would point to esophageal perforation, or those pointing to mediastinal abscess is unusual in deaths resulting from an esophageal foreign body.

6. Death in this case may be ascribed to lowering of resistance following flu, ether anesthesia probably acting as exciting cause of lung abscess. Hemorrhage being due to erosion of arteriole, pneumothorax caused by connection between pleura and terminal bronchiolus.

COCAIN IN NASAL ANESTHESIA; AN ATTEMPT TO ESTIMATE THE AMOUNT OF COCAIN ACTUALLY GETTING TO THE PATIENT WHEN SOLUTIONS OR PASTE ARE USED AS TOPICAL APPLICATIONS.

Dr. E. F. Howard, Vicksburg, Miss.

In the reports of the Committee on Toxic Effects of Local Anesthetics, one point stands out very emphatically—the practically universal use of unmeasured quantities of cocain in nasal work. The suggestion of Dr. Mayer that we should have some idea of the quantity used in any given operation is eminently sensible, if for no other reason than that it might prove a valuable point in the defense of a suit for damages. That suggestion incited the study that forms the basis of this article.

From the operating room nurses we learned that the amount of powdered cocain put on the tray for a septum resection, when it was to be used in the form of paste, was approximately 4 grains. When a solution was to be used, about 2 drams of 10 per cent was the amount ordinarily supplied. It was the general impression that some, whether powder or solution, remained unused, after the operation. Recalling what I have seen in other operating rooms, I am inclined to believe that this represents the average accuracy fairly well.

Dr. Mayer suggested that the amount set out for operation and that left after the operation be accurately determined, in order that we might say "not more than so much was used." But there is a very definite amount of waste, and an effort was made to determine what it might be.

Dr. A. A. Aita, chief of the laboratory at the Vicksburg Infirmary, very kindly undertook the real work of the investigation and personally weighed the powdered cocain and prepared the solutions for use in the operations. A series of septum resections was done, alternating cocain paste and 10 per cent solution for the anesthesia. All swabs, as soon as they are used, were put in a glass receptacle and this, together with the remainder of the original supply, returned to the laboratory. Dr. Aita then weighed, or measured, the unused powder, or solution, and determined the amount of cocain remaining in the swabs.

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We then knew the amount of cocain put out for each operation, the amount unused and the amount wasted—remaining on the swabs—and had therefore a rather more definite idea of the amount actually used than when we had only the first two figures of the equation. The average of the series was:

With cocain paste,			
Supplied for operation			275. mgr.
Returned in original container	174.6 mgr.		
Recovered from swabs	15.15 mgr.		189.75 mgr.
Amount used			85.25 mgr.
With 10 per cent solution,			
Supplied for operation	10. c.c. =		1000. mgr.
Returned in original container	7.35 c.c. =	735. mgr.	
Recovered from swabs		39. mgr.	774. mgr.
Amount used			226. mgr.

The variation is startling. The minimum amount used on any case in the solution series was more than twice that of the maximum in the paste series.

There are two points in connection with the technique of the anesthesia that I have not noticed in the work of others, though doubtless they are familiar to many.

1. By swabbing the septum with adrenalin (1-1000) two or three minutes before applying the cocain, I get quicker anesthesia with less cocain. In using this method, I have not, so far, had any case that showed the violent reaction sometimes seen when adrenalin, alone, is put into the nose.

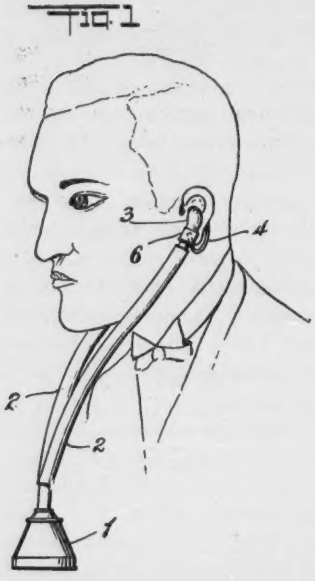
2. In using the paste, a swab is dipped in adrenalin (1-1000) and squeezed fairly dry between thumb and finger, the act of squeezing flattening the swab. One of the flat sides is touched lightly to the powdered cocain until a sufficient amount, estimated, is taken up and this is rubbed on the septum. Thus there is cocain on one side of the swab, only, and little or none gets on the turbinates, which cannot but be the case when swabs saturated in solutions are used. Therefore a smaller area of the nasal mucosa is absorbing cocain.

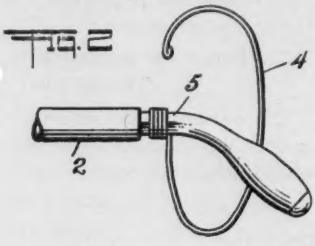
Undoubtedly the entire investigation is on too small a scale to really mean anything, much less to be conclusive, but if the idea is to subject the patient to the least possible risk—and even the 51 mgr. that constituted the minimum amount used in the entire list might cause trouble in a susceptible patient—the matter seems worthy of consideration.

A HELPFUL INSTRUMENT IN THE CATHETERIZATION OF THE EUSTACHIAN TUBE.

DR. LOUIS BLUMENFELD, Brooklyn, N. Y.

When I first began to catheterize Eustachian tubes, I found that the most difficult thing was not to locate the nasal opening of the tube, but to keep the diagnostic tube in my own ear. Just as I was getting all set to inflate the middle ear, the diagnostic tube would fall out of my ear, and at times it was most difficult and annoying





to try to keep the diagnostic tube in the proper axis of the canal of the ear. If the tip of the diagnostic tube would stay put, it would point in most every direction except in the direction of the axis of the canal of the examiner's ear. The weight of the rubber tubing would cause it to point upward and toward the posterior-superior canal wall, so that if I was fortunate in having the tube stay in my

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ear, I would not get the full value and force of the sounds produced in the middle ear by inflation.

I therefore began to look for some method or means whereby the diagnostic tube once inserted into the ear would stay put and would point in the axis of the canal. I hereby offer the results of my efforts to my colleagues, and hope that it will help them as much as it has me. With this little adaptation I can place the tip of the diagnostic tube in my ear and forget it. It stays there and always points in the proper axis of the canal.

Previous to its use I confess I commenced a catheterization with misgivings, and at times I almost lost my temper, when I repeatedly inserted the tube and have it fall out every time either I or the patient moved. Since I had this little instrument made, catheterization has become a pleasant process to me and I believe my disposition has improved. The instrument is very light, practically without weight, and does not hurt the ear even after it has been on for a long time.

I have also had a pair of these ear clasps made for a small pocket stethoscope and use it instead of the usual bulky binaural stethoscope. I find it far superior to the ordinary scope, in that it is:

1. Less bulky; it does away with excess and useless metal.

2. Does not hurt or exert pressure on the ear canal.

3. It really makes the stethoscope a pocket stethoscope, easy to carry about your person and yet does not lose any of the efficiency of the old regulation binaural stethoscope, in that it remains fixed in the ear and in the proper axis of the canal.

The accompanying drawings are very plain and no further explanation of this little instrument is necessary.

1564 St. Marks avenue.

THE USE OF GOLD-WIRE SPLINTS IN INTRANASAL PLASTIC SURGERY.

DR. WILLIAM WESLEY CARTER, New York City.

Owing to the large number of inquiries which I have received from my confreres in various parts of the country concerning the use of gold-wire splints in the after-treatment of intranasal plastic procedures, especially the sub-mucous operation, and the fact that I have made no detailed report of this method since my first introduction of the subject before The American Laryngological, Rhinological and Otological Society several years ago, I feel that a description of the use of this splint may be of some practical value, especially as years of experience have added to my knowledge of its efficiency.

Though I make use of gold wire as a splint in many of my nasal deformity operations, I will refer only to its use in the submucous operation on the nasal septum, where the demand for a splint of this kind is constant.

Every experienced rhinologist knows that after the submucous operation the patient objects more strenuously to the plugging up of his nose than he does to the operation itself, and yet the surgeon knows that the submucous flaps must be pressed together and held by some means until the danger of hemorrhage is passed and primary union has taken place. I first advised the use of narrow strips of vaselin gauze as a packing. As this was put up in test tubes and sterilized, it made an ideal packing. The objections to its use are: it is uncomfortable to the patient, as nasal obstruction is complete, drainage is not free and when the gauze is removed hemorrhage is apt to occur, sometimes to an alarming extent. I still use vaselin gauze where I feel that it is especially indicated, but these cases are now limited almost exclusively to my nasal deformity work; in doing the submous operation I have found the wire splint preferable.

The gold-wire splint is made just before the operation and is shaped to suit each individual patient. First an obturator, somewhat in the shape of the Asch hard-rubber splint, is whittled out of white pine; this is made a little smaller than the nasal cavity,

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around this obtubator, in a spiral is wrapped a piece of No. 7 dental gold-wire, usually about 12 inches long. The spiral thus formed is pressed firmly with the fingers, in order to overcome the tendency of the wire to straighten. The splint is covered with vaselin and transferred directly into the nose from the obturator, or it may be removed from the latter and introduced by means of a pair of long, straight hemostatic forceps. I usually place the splint in the side where the incision is made first and then introduce a similar one in the other side. When the splints are adjusted, the ends of the wire are bent inward. The anterior end of the splint should rest in the vestibule and below just within the anterior nares. Care should be taken that none of the wire coils are left pressing into the incision.

The action of these splints is to keep both nasal cavities wide open, and to hold in close contact with each other the submucous flaps by a continuous light, springy pressure. The advantage of this will be recognized at once by the experienced rhinologist. Hemorrhage, both primary and secondary, is less apt to occur; consequently the risk of hematoma, with its attendant danger of infection and abscess formation, is very much less. The secretions from the nose and the drainage from the operative wound have free exit. The nasal cavities can be easily cleansed and the progress of the case noted by direct vision. It is difficult to estimate the advantage to the patient who is able to experience at once free nasal respiration and to enjoy the benefits of the operation as soon as it is finished.

Unless there is some contraindication, I remove the splint on the third day. This is done by catching the ends of the wire with the thumb forceps and gently pulling. The coils readily straighten out and the removal is effected with no difficulty and little discomfort to the patient.

The subsequent treatment consists merely in keeping the nose clean, a mild alkalin solution being best suited for this purpose.

24 East 48th Street.

A NEW DOUBLE NASAL SPECULUM.

DR. M. JOSEPH MANDELBAUM, New York City.

Various means have been devised whereby the rhinologist might obtain a simultaneous anterior view of both nasal chambers for the purpose of diagnostic inspection and also for intranasal operative procedures; principally that for submucous resection of the septal cartilage.

Among the better known instruments for this purpose are those by Levy, Levy-Struycken, Killian and Unger.§ These, however, are all self-retaining and their chief disadvantage is that when both pair of speculae are in position, the tissues of the nasal vestibules become fixed and the resultant rigidity does not permit the degree of mobility necessary to manipulate the instruments.

To overcome this difficulty I devised a double nasal speculum which consists of the commonly used type of bivalve speculum, to the distal end of which an extra pair of retracting blades are attached by a small connecting bar; the interval between the two pair of blades being sufficiently wide and deep to permit the reception of the columella and inferior portion of the nasal septum.

The speculum is so arranged that when the opposing blades are separated, the distal pair separate the same distance as the proximal pair.

The speculum may be used as a single speculum for either side. If held in the left hand of the operator in examining the patient's right nostril, the distal blades are utilized. For examining the left nostril the proximal blades are used.

For rhinological work it serves a double advantage, diagnostically and surgically.

For the purposes of diagnosis, upon inserting the instrument simultaneously into both nostrils and spreading the blades, one gets at once an excellent exposure of both nasal chambers permitting one to estimate immediately the degree and nature of septal irregularities and deviations and especially to determine the *thickness* of the nasal septum in its various parts, which is not possible with the old single type of nasal speculum. It also permits a more satisfac-

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 20, 1925.

§Unger, Max: A new, double, self-retaining nasal speculum, J. A. M. A., Vol. LXII, 1557, (May 16) 1914.

tory inspection of both nasal chambers for the purpose of comparison of the two sides.

It is of particular advantage in the operation for submucous resection of the septum, inasmuch as with the single pair of blades one has to shift the instrument from time to time from the side being operated upon to the opposite side, to note whether there is danger of perforating the mucous membrane on the other side.

In doing so one frequently loses not only time, but the position of the end of the instrument used for the separation is lost. With the double nasal speculum this difficulty is obviated and one can proceed with greater certainty as well as rapidity, as it is only necessary to throw the reflected headlight to the side desired without moving the speculum.

Another use to which the instrument lends itself is of a very distinct advantage, *viz.*, in packing the nasal chambers after various intranasal operations and particularly in the operation for submucous resection of the nasal septum, the amount of pressure from the packing should not be great enough to push the septum too far beyond the median line into the opposite nasal chamber. With the single nasal speculum one cannot see how far the septum is bulging into the opposite nasal chamber without removing it, as in so doing one loses time as well as the position at which the speculum was placed before its withdrawal; with the double nasal speculum one can readily inspect both sides while the packing is performed and the proper amount of gauze needed can be introduced without producing harmful pressure, thus insuring an accurate vertical position of the resected septum in the median line, preventing undue strain on the sutures and rendering certain a satisfactory end-result.

The speculum was made by Geo. P. Pilling & Son, of Philadelphia.

125 West 72 Street.

A NEW ARTIFICIAL EAR DRUM.*

DR. H. J. ISAACS, New York City.

Almost any foreign material introduced into the ear, will, in certain cases, act as an artificial ear drum. In cases of dry perforation of the membrana tympani, where the tuning fork tests show little or no secondary nerve degeneration, the use of this artificial ear drum shows an immediate and striking improvement in the hearing. And yet this simple means has, of late, been allowed to fall into disuse, because of the two great disadvantages possessed by all the drums now employed. The first is the annoyance of changing the drum daily and the second is the tendency which they have to initiate an otitis media or an external otitis.

Although the oldest medical literature makes mention of the practice of introducing foreign bodies into the ear to close over perforations, this was done merely as a protection to the tympanic cavity and had no relation to the function of hearing. James Yearsley, in 1848, was the first to note that in some cases the mechanical closure of the perforation caused a marked improvement in the hearing immediately. He discovered this empirically, and since his time many theories have been proposed to explain the principle of action. Thus far none of these theories seems to fit all cases. We are dealing here with a derangement of the mechanics of the middle ear, and until the exact mechanics and functions of the ossicles and drum, and the exact manner in which a perforation disturbs these functions is known, we will not be able entirely to explain how the artificial drum restores hearing.

As a working hypothesis, however, we may make use of the following simple explanation which will serve all practical purposes: With an intact drum the sound waves are impressed more forcibly upon the oval window, the consequent intralabyrinthine pressure being compensated for by the resiliency of the round window. In other words, an internal movement of the oval window is accompanied by an external movement of the round window, and vice versa. With a perforation of the drum the round window is exposed to the direct action of the sound wave, and its movement, which is contrary to that of the sound wave, is inhibited. The

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*Read before the Section on Otology, New York Academy of Medicine, May 8, 1925. From the Oto-Laryngological Department of Beth Israel Hospital.

amount of hearing varies inversely with the amount of interference with the movement of the round window. In cases where the pressure is sufficient to inhibit its movement completely, hearing will be *nil*. The artificial drum, by closing the perforation, and thus shielding the round window from the direct action of the sound wave, may be conceived of as restoring the normal relationship of both windows.

In practice, the artificial drums that have been used fall into two distinct classes: The Yearsley and the Toynbee types.

The Yearsley drum is merely a pledget of cotton moistened with water, salin solution or liquid abolene, which is placed in contact with the membrana tympani. This has to be done under direct illumination, and its insertion is rather difficult, as, unless it is placed in exactly the right position, it will tend to make the hearing worse instead of better. Its removal by the patient himself is attended by the danger of injuring the canal and tympanum, or of allowing a small portion of the cotton to remain behind. Its main disadvantage, however, is that of introducing a fluid into a previously dry tympanic cavity, causing in a short time, a maceration of the delicate epithelium of the ear drum and tympanic cavity. It must be removed every day and the ear must be carefully cleansed and dried before reinsertion.

The Toynbee drum consists of a thin disc of rubber to which is attached a short silver rod. This is far preferable to the Yearsley drum, but likewise has features that condemn it. Introduction and removal are painful, excoriations and abrasions of the canal being easily produced. Chewing and swallowing produce loud cracking and thundering noises. The rod itself may injure the canal wall and produces an unpleasant sensation by its vibration. This drum must not only be removed every night and reinserted in the morning, but the ear must become accustomed to its presence by the wearing of it for short periods every day. It deteriorates rapidly and must be renewed frequently, and therefore involves somewhat of an element of expense.

The main objection to both of these drums, however, is that they will, almost invariably, cause the production of an acute otitis media in an ear which has previously been dry. The maceration and congestion produced by their presence lessens the resistance of the part, and forms a favorable culture medium for the growth of whatever organisms happen to be present, or may be introduced, by the frequent manipulation required. The fact that we are introducing a foreign body into a very sensitive region has apparently been over-

looked. Consequently no special attempt has been made to employ a non-irritating substance.

It was mainly to overcome this objection that I have devised the drum which I now wish to present. It is made of ordinary flexible collodion. This is inert, insoluble in the body fluids, and, as has been demonstrated, produces no foreign body reaction, even when buried in the tissues.

These drums can be made in a few moments from material which is almost always at hand. A short glass tube, sealed at one end, is used as the mold. This should be of the approximate length and width of the patient's external auditory canal. The tube is cleaned with alcohol and ether and thoroughly dried. A few drops of collodion are poured into it and the tube is slowly rotated until the collodion forms a smooth inner coating. In from two to three minutes the collodion will have hardened sufficiently to be removed. By means of a forceps, it is gently separated from the glass, from which it detaches easily, and extracted from the tube. This leaves a soft, pliable, transparent tubule, similar in size and shape to the original glass mold. A cotton-tipped applicator is inserted into it and the drum is introduced to the bottom of the canal. Here, by gentle manipulation it is applied in close apposition to the perforation or internal tympanic wall. The placing of it in correct position is rendered simple by the transparency of the drum, through which the structures behind it are visible.

I have been using this type of artificial drum for the past four years with excellent results. It is made in a few moments, as required. I have even taught some of my patients to make the drums themselves, and they quickly acquire the knack of inserting and removing them. Since the drum is non-irritating it does not cause any reaction of the tissues with which it is in contact. Hence it may be allowed to remain in place indefinitely. There are two indications for changing it. The first is an accumulation of cerumen, which has to be removed. The second is a shifting of position, which evidences itself by a return of the deafness and tinnitus. Otherwise no attention need be paid to it.

Summing up, the drum herein described combines the softness of the cotton pledget of Yearsley with more convenient form of Toynbee's rubber disc, and is pliable, transparent, easily made, non-irritating, and semi-permanent.

120 West 86th Street.

A NEW PARACENTESIS KNIFE.

Dr. Samuel Cohen, Philadelphia, Pa.

The incising of the membrane tympani is usually not fraught with any danger, but occasionally some untoward sequence follows, and the operator immediately tries to find some means of preventing a recurrence of his unpleasant experience. The accidents incident to this minor procedure (paracentesis tympani) are the puncturing of the lateral sinus, which may be placed far forward; the opening into the jugular bulb, especially when a dehiscency exists; or an incision into the carotid artery. The cutting of the facial nerve also may occur, and can be cited among the possible accidents incident to the operation.

An occurrence that is very frequent, and one that some claim is not harmful, while others claim that it may produce a great deal of damage, is the striking of the inner wall of the middle ear (prom-

ontory). Some of us believe that striking the inner wall of the middle ear may lead to an inflammatory process in the middle or internal ear, with subsequent unpleasant results. All must admit that it is better not to strike the promontory if possible. This knife was made especially with that purpose in mind.

The blade is short, .1093 of an inch in length; .0468 of an inch in width; and .014 of an inch in thickness. The shank is .058 of an inch thick. The length from the screw to the shank is 2⅝ inches. The blade is pointed and has a slight curve so as to enable the operator to cut in a definite direction. The handle is so constructed that when the knife is not in use it can be reversed and fitted into it.

The distance between the drumhead and the promontory is much greater than the length of the balde, thus making it almost impossible, when due care is used, to touch it in doing a paracentesis. Instinctively the operator stops penetrating the knife as soon as he feels the shank touch the drumhead.

2009 Pine St.

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IN MEMORIAM

FRANCKE HUNTINGTON BOSWORTH, A. B., A. M., M. D.

By Dr. D. Bryson Delavan, New York.

I desire to ask attention to an event of profound interest to the world of laryngology, an event which removes one to whom all civilized mankind are under a debt of obligation, the weight of which the present generation can hardly comprehend.

Dr. Francke Huntington Bosworth—Patriot, Student, Investigator, Teacher, Writer, Inventor, Creator—is dead! Dr. Bosworth was the son of Daniel P. Bosworth, a merchant, and Deborah Wells Bosworth, his wife, both of New England origin dating back many generations. He was born January 25, 1843, in Marietta, Ohio, where his school days were spent, and where he also attended Marietta College from 1858 to 1860. At the outbreak of the Civil War, President Lincoln called for volunteers for a period of three months, no one then dreaming of the long continuance of the war. Young Bosworth at once enlisted and was sent with his company to West Virginia, under General Rosencrans, where he came in close relations with the enemy. At the expiration of his term of enlistment he returned North and entered Yale College, graduating in the class of 1862. A number of men who distinguished themselves in medicine were at Yale in Bosworth's time, among them Dr. A. Brayton Ball, Francis Delafield, James W. McLane, Edward L. Keyes, Lewis A. Stimson, Albert H. Buck and Thomas E. Satterthwaite, all of whom were members of the New York Academy of Medicine.

Immediately after graduating, Dr. Bosworth returned to Marietta and again enlisted, in the Quartermasters Department, in the Ohio State Militia, with a company made up from his fellow-townsmen. The regiment was sent to the Peninsula, where it was engaged in active service, taking part in the repelling of General Morgan's raids

and during the summer of 1864 serving around City Point, Virginia. Having completed his military service, he determined to take up the study of medicine, came to New York, and matriculated at Bellevue, from which school he graduated in 1869 as valedictorian of his class. He then secured an interneship at Bellevue Hospital, and having completed it, entered upon active practice in New York City.

He at once became interested in the study of the diseases of the upper air tract, and in 1871 was appointed lecturer upon this subject at Bellevue. In 1881, he was apointed to a full Professorship, which he held until 1898, when the Bellevue school united with the Medical Department of New York University, Dr. Bosworth continuing in his position as Professor until his final retirement from active work.

The career of Dr. Bosworth was marked by great industry and untiring energy. Enthusiastic in the development of the department of his choice, he gave to it the full devotion of his life. He distinguished himself as a writer, a teacher, and a practitioner, but it is upon his eminence as a pioneer contributor to the pathology of laryngology and rhinology that his fame will endure.

His theses and published articles, covering a long period of years, were numerous, comprehensive, and valuable. Possessed of unusual literary ability, his style was clear and forceful. The many new ideas which he advanced were upheld with the full courage of his strong convictions, not seldom against adverse but, as time proved, mistaken criticisms. In discussion he delighted in drawing forth the arguments of the opposition, not so much for the pleasure of successfully refuting them as for the profit of recasting and correcting such of his own views as might be imperfect before finally committing them to print. He had well learned the secret for the successful launching of a new idea, namely, that to cause it to be accepted it must first be intrinsically good, and then brought vigorously before the world by persistent, oft-repeated attacks through the media of the journals, the lecture, and the Society debate. With

untiring industry and rare singleness of purpose he worked for the advancement of his chosen art.

Early in his career, he entered upon the field of publication and in 1879 issued a "Handbook Upon Diseases of the Throat for the Use of Students." In 1881, appeared his Manual of Diseases of the Throat and Nose. For the next ten years he was busily engaged in the preparation of his greatest work, a treatise in two large volumes on "Diseases of the Nose and Throat." These volumes appeared, respectively, in 1890 and 1892. Meanwhile, the importance of the nasal region, never before fully appreciated, had impressed Dr. Bosworth so forcibly that in this publication he changed the sequence of the title of his work, and for the first time in history, instead of using the time-honored title—Throat and Nose—reversed the order. Finally, in 1896, he issued his "Text-book on Diseases of the Nose and Throat," a book which for many years enjoyed the popularity which it deserved.

The treatise of Dr. Bosworth in two volumes, published in 1890, was a monumental contribution to Laryngology. Together with the pioneer work of Dr. J. Solis Cohen, of Philadelphia, published in 1878, and that of Sir Morel Mackenzie, which appeared in 1882, it marked an epoch in the advance of our specialty. Works had been published by the early laryngologists in various countries of Europe, some of them of distinguished merit, but it remained for Dr. Solis Cohen to present the first really comprehensve treatise upon the upper air passages ever issued. It dealt with the whole realm of the subject, and was beyond question a determining influence in establishing upon a definite basis the specialty of Laryngology. Dr. Mackenzie's classic work, which followed in 1882, was different in style from that of Dr. Cohen, but scholarly, practical, and complete, it embodied the wide and long-continued experience of the most accomplished laryngologist of his time.

The therapeutics of the specialty, theretofore chaotic and eminently crude, were by Mackenzie reduced to a scientific basis. Many of his remedies and methods have never been improved. Finally,

with the appearance of Bosworth's great work, the specialties of laryngology and rhinology were thoroughly placed before the world.

It is interesting and significant to note that this great scientific accomplishment was attained by three English-speaking men, two of whom were Americans.

In the study of rhinology, Dr. Bosworth became more and more impressed with the eminent importance of the nasal cavities. Upon the early recognition of this fact, he greatly prided himself.

His success as a teacher was attested by the large number of students who sought his instruction at Bellevue over a period of many years. His enthusiasm was genuine and infectious, and through his disciples as well as through his writings, served to carry far and wide the knowledge of the new science. The vast numbers of patients who resorted to the Bellevue clinic gave abundant opportunity for observation and investigation, which he zealously improved. A keen diagnostician, he utilized his material not only for teaching purposes but for the development of his original and progressive ideas. No case of importance escaped his skillful handling, his carefully noted records, and the knowledge thus obtained was later widely diffused through his able publications. This practice carries a weighty suggestion: First the case, its study and treatment; second, the record; third, the book.

In the course of Dr. Bosworth's writings many new ideas were presented, most of them original, some the application of the suggestions of others. While distinguished in many directions, he will always be best known by his notable contributions to rhinology. Prior to his time the nasal region had been largely ignored. The

The causes of mouth breathing, the physiology and pathology of the sinuses, the existence of remedial nasal obstructions, received no attention, even among the leaders of laryngology. The distinguished American observer, Catlin, had long before recognized the existence of mouth breathing and had warned of some of its evil results, but neither he nor anyone else had clearly recognized its causes or suggested means for their relief until Dr. Edward Woakes, of London, published some ideas upon what he called "necrosing

ethmoiditis," and advocated the use of the saw for its relief. As commonly hppened in those days of the tardy recognition of good work, the ideas of Dr. Woakes were not generally accepted. Dr. Carl Seiler, of Philadelphia, a man of great discernment and originality, who first used the perforated nasal splint afterwards perfected by Asch, attempted to remove septal obstructions by means of a metacarpal saw. Before the days of local anesthesia this was difficult and unpopular. Bosworth also had been studying the matter. He found that many serious conditions of obstruction were caused by septal ridges and spurs. No other treatment of them was practicable but their mechanical removal. Certainly at this particular time fortune smiled upon Dr. Bosworth, for coincidently with the idea which had come to him cocain was introduced, he devised his admirable little saw, and the riddle of nasal obstruction due to septal spurs was solved. True, better methods have been found since that early time. Bosworth's method was not perfect, and, besides, little heed was paid to the mucous membrane, but the results he obtained by it in those early days were often remarkably good. Through Bosworth's eloquent advocacy and through the oft-repeated visible evidence of the value of the method, its popularity was almost instantaneous. By this and by his other valuable contributions, the attention of the world was directed to the nasal region. Brilliant scientists like Jarvis, Harrison, Allen, Bryan, John Mackenzie, Roe, Shurly, Daly and others in this country, Moure, of Bordeaux, Zuckerkandl, of Vienna, and others of the continent of Europe and in Great Britain took up the study and the science of rhinology was triumphantly launched.

One of the most interesting phases of Dr. Bosworth's life was his connection with the New York Laryngological Society,-the parent of the Section on Laryngology and Rhinology of the New York Academy of Medicine. The story of the founding of this Society should be familiar to all. It is probable, however, that few have heard of its origin and realize the important influence which it exerted in the early days of laryngology. This is true largely because of the inaccuracy of the reference that have been made to it by those

who have mentioned it in their historical reports. In these it has been cursorily dismissed as "a society which had a brief existence and was soon lost sight of." No one should be willing to thrust the matter aside so cavalierly, for the New York Society was the first Society of Laryngologists in modern history. Founded in 1873 by Dr. Clinton Wagner, Drs. Bosworth, Lefferts, Asch, Woolsey Johnson, Kinnicutt, Mann, McBurney, and Weir were its Charter Members. It was the birthplace of scientific rhinology, and in many respects the cradle of modern laryngology in the United States. The men who organized it had received special instruction abroad and represented the very best element of the profession of the time. The Society was organized not only for mutual improvement and the advancement and enlargement of the limited knowledge of the nose and throat, but also with the view of establishing on a sound footing with the medical profession the specialty of laryngology in this country, for the reason that many of the physicians of the time looked askance at all specialties.

Following its founding, monthly meetings were held regularly at the houses of members of the Society for about ten years. The membership was gradually increased, the meetings were well attended, and much enthusiasm was shown in the advancement of the infant science. Familiar with their character and purport during the later years of the Society, I cannot recall the memory of them without a thrill of pride. Many of the members were engaged actively in the pioneer work which made them famous, and it was at the meetings of the Society that their epoch making ideas were first exploited and discussed. With such men, and others like them, young, brilliant, and filled with enthusiasm for the new art, it is not strange that the contributions of their genius and the discussions on them should have made the meetings of the Society well worthy of an honorable place and a clear and permanent record in the history of medicine.

Among the noteworthy members of the Society, none was a more regular attendant at its meetings or a more valuable contributor to them than Dr. Bosworth.

Dr. Bosworth was an Episcopalian and in politics a staunch Republican. Regarding him from the human side, his general interests were wide. He had many acquaintainces among actors and dramatists. In his earlier days he was fond of horses and gained much diversion from daily drives along the uptown speedway behind his handsome fast trotter. Among the first to take up golf as an exercise, he played with vigor for many years, although never highly expert. His interest in vne arts was discriminating and accurate. He was a member of the Union, the Players, and the Social Arts Clubs, and of late years a familiar figure at the University Club.

Considering the work of the present day in relation to what has preceded it, and while fully appreciating the great advances made, we are met with the fact that much valuable matter of other days has been lost. This deeply impresses upon us the importance of going backward and studying carefully the methods of the great masters of laryngology. Many valuable lessons are still to be learned from them, chief of these, perhaps, that not all of the good things of laryngology are utilized by us today. In certain instances methods which a number of years ago were recognized as valuable have been completely supplanted by others not nearly as good. A new thing is not necessarily better because of its novelty. Another distressing fact is the ease with which the names of our instructors have in so many instances been forgotten, simply because some recent successor has made a slight modification of a method which is in itself classic. Here, after all, as in all other departments, wide and accurate knowledge, based upon rich experience, keen judgment and, finally, a highly conscientious view of the best interests of the patient are essential. In all the things in which Dr. Bosworth was pre-eminent, his work is well worthy of our attention today.

It may be that in the time to come Dr. Bosworth will be known by some one of his lesser gifts to medicine, but in company with Solis Cohen and Sir Morell Mackenzie, he, more than any who had gone before gathered together the disjointed and scattered fragments of laryngological knowledge, developed the science of rhinology, and,

welding all into a perfectly co-ordinated form, intelliently established them as definite departments of medical science.

He was a man of ideas; a dreamer of dreams, dreams in which he himself believed; a man strong enough and earnest enough to make his dreams come true, and to impress the truth and the value of them upon the world. Great ideas grandly impressed can only come from one who in himself possesses elements of greatness.

Dr. Bosworth was a member of the New York Academy of Medicine, the American Medical Association, the American College of Surgeons and of many smaller medical associations. He was a charter member of the New York Laryngological Society in 1873 and a Founder of the American Laryngological Association in 1878 and its President in 1883. Distinguished recognition was shown him abroad. He was an Honorary Fellow of the National Associations of Great Britain, France and Germany. At the Eighth International Medical Congress, held in Copenhagen in 1884, he was a conspicuous member.

Dr. Bosworth was married September 21, 1871, to Miss Mary Hildreth Putnam. Mrs. Bosworth died about ten years ago. Two children survive him, a son, F. H. Bosworth, Jr., Professor and Dean of the School of Architecture in Cornell University, and a daughter, the wife of Walter R. Herrick, of New York City.

IN MEMORIAM

HENRI LUC, 1855—1925

By Dr. J. Guisez, Paris.

We cannot close this tomb without giving expression to the sentiments of his confreres in laryngology.

Luc was a man of striking intelligence, a forehead modeled like that of Verlaine with the eyes of a thinker, bright, reflecting his thoughts exactly and his clear mind. A first acquaintance with Luc was always favorable and this impression grew all the stronger as one conversed with him, not alone upon the subject of medicine, but upon a multitude of subjects which interested him—literature, art and foreign languages, for which he had a veritable passion.

At the very beginning of his career, he devoted himself to our specialty as it was practiced in France at that time. He went to Vienna in 1887 to study the new methods which were attracting attention and he brought them to France and put them into practice, but not without a special touch that marked his originality. From that time on, he attempted the radical cure for suppurations, a procedure that was rarely ventured at that period. He described several operations which are still classics and which are known by his name in the French and foreign text-books; Ogston-Luc for the frontal sinus; and Luc-Caldwell for the maxillary sinus operation.

In 1899, with Dr. Ruault, he founded the Archives Internationales c'Oto-Rhino-Laryngologies, a periodical which he continued to publish until 1896, and in which appeared a large number of his original articles, analyses and the most important articles appearing in foreign journals, which kept his colleagues informed of the evolution of the specialty. Among the most important work of this initial period was the first article on the "Suppurations of the Maxillary Antrum" and a memoir on "Tracheal Ozena," an affection not previously described.

In 1890 at the International Laryngological Congress at Berlin, he made a report on the Evolution of Adenoid Vegetations at different ages.

In 1892, he published a very complete treatise on Laryngeal Neuropathy in the Charcot-Debore Collection. In 1895, he was invited to the meeting of the British Laryngological Association in London to open the discussion on the "Surgical Treatment of Affections of the Accessory Cavities of the Nasal Cavities" and in 1899 he was invited by the same association to report on the subject of "Indications for Surgical Intervention in the Mastoid Cavity." During the same year at Portsmouth, he presented one of the first known cases of "Osteo-myelitis Invading the Cranial Bones."

In 1903, at Washington, he presented a paper on "Surgical Opening of Suppurating Frontal Sinus." In 1905, at Brussels, he made a report of a new case of Osteo-myelitis, and at the Congress of Buda-pesth, in 1910, a memoir on the same subject was contributed. He took a prominent part in the discussion on Laryngology under local anesthesia at the Vienna Congress in 1906.

In 1911, at the Berlin Congress, he presented a Memoir on the "Radical Cure for Chronic Suppuration of the Frontal Sinus," and in 1912, at Boston, he gave the first-time description of "Subperiosteal Mastoid Abscess, Without Intra-osseous Suppuration." Finally, in 1912, at the Oto-Laryngological Section of the International London Congress, he was a leading advocate of Local Anesthesia in the principal operations of Oto-Rhino-Laryngological practice.

Dr. Luc was one of the oldest members of the French Society of Oto-Rhino-Laryngologists and was both Vice-President and President of the Society, and was one of its most regular attendants. It was there that he reported his work on "Surgical Operations of the Nasal Accessory Cavities Aiming Toward a Radical Cure of Their Suppuration." Through his works a surgical direction was given our specialty which it has conserved and which in reality marks its ascent.

Luc exemplifies what will-power may accomplish. Without official encouragement, in a modest clinic, he created a real school, to which French students and foreigners came for many years to complete their special education. No foreign colleague came to Paris without visiting Luc's clinic. He had a real gift for instructing others and his courses were so clear that interest in them never flagged. The treatise embodying these lectures met with consider-

able success.* The series of facts and observations made at the bed-side, composing the treatise, read as easily as a recital of news.

His knowledge of foreign languages, which he spoke with such facility and elegance when attending different congresses, caused one President to remark, "I do not know whether to congratulate Dr. Luc more upon the form than the substance of his discourse." This knowledge attracted many specialists to his clinical demonstrations and I recall hearing him explain the technique of one of his operations in four different languages.

All of his knowledge and his organizing ability was given to the service of his country when the war began and though military obligation did not require it, he assumed the heavy task of directing the oto-laryngologic service at Val-de-Grace, whose incumbents were at the front. These services were recompensed at the end of the war by the ribbon of the Legion of Honor; he had been a chevalier since 1904. At the close of this intensive application, he felt the first symptoms of the incurable ailment which slowly brought on his end, though his admirable mental faculties suffered no diminution.

His colleagues and his friends, who regret sincerely his demise, value even more than his scientific merit his great affability, the hearty welcome which colleagues and students always received, and the courtesy with which his discussions were carried on in our societies. At first sight he may have appeared severe, but this very severity he imposed upon himself and it hid an excellent heart. He was a model of professional integrity in all his acts as he was frank in his speech and in his writings.